Federal System in India: Challenges and Concerns

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ABSTRACT:

Federalism is a system of government in which power is divided between a central authority and constituent political units. Federalism is the most relevant factor of modern constitutionalism. The core objectives of Indian federalism are unity in diversity, devolution in authority, and decentralization in administration. Indian Federalism is different from the type of Federalism practiced in the countries like the United States of America. Democratization and decentralization are the interdependent processes. Dissemination of power from one centre helps in empowering the people and can also held the government accountable for exercising political power. In India, as the democratic institutions started maturing, the tendency towards centralization of power is being increasingly questioned and the efforts of decentralization and participation of the citizen in the management of their local area, is being encouraged. India is great country as for as its rich heritage and culture is concerned. History shows that great kingdoms were subjected to downfall because of lack of unity and integrity. India is a symbol for unity in diversity. This paper describes the challenges and concerns of the Federal System in India.

Keywords: Indian Federalism, Democratization, Decentralization, Dissemination, Political power
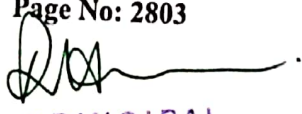
INTRODUCTION:

Federalism is a system of Government in which there is a separation of power between a central authority and different constituent units of the century. Generally, a federation includes two levels of Government: at one level there is a Government for the whole country that is responsible for a few subject of common interest, and at the second level are the governments of states or provinces that take care of much of the day-to-day administration of their state.

Federalism was introduced in India by the Government of India Act, 1935. While drafting the Constitution of Indian, the framers wanted to give a federal look to it considering the pluralistic characteristics of India. The Constitution contains certain integral federal features such as two governments; division of powers between the union and its constituents; supremacy of the Constitution; rigidity of the Constitution; independent Judiciary; bicameralism. Unlike the true federal states like the USA, Indian federation was not a result of a compact between several sovereign-units but a product of conversion of a unitary system into a federal system.

It is a compromise between two conflicting considerations such as autonomy enjoyed by states within the constitutionally prescribed limit (State List) and the need for a strong centre in view of the unity and integrity and sovereignty of the country. Unitary features of the Constitution like single Constitution; single citizenship; flexibility of Constitution; integrated judiciary; appointment of the Centre; all India Services and emergency provisions. During national and state emergencies the Union Government assumes undisputed power over the whole or any part(s) of India. The Parliament has the power to make laws even on

Grasses of Arid Zone of Peninsular India

B. Ravi Prasad Rao, K.V. Subbaiah, P. Priyadarsini

GRASSES
of Arid Zone of Peninsular India

ABOUT THE BOOK : The book deals with the grasses of Arid zone of peninsular India encompassing three Rayalaseema districts of Andhra Pradesh ie Anantapur, Kurnool & Kadapa and eight districts located in north-eastern region of Karnataka ie Bellary, Koppal (in erstwhile Raichur district), Bijapur, Bagalkot (in erstwhile Bijapur district), Chitradurg, Gadag (in erstwhile Dharwar district), Kolar and Tumkur. A total of 216 wild and naturalized grass taxa comprising 214 species and 75 genera are described in the book with illustrations and photographs for selected species. Of the grasses of arid zone of peninsular India, Karnataka region harbours 204 taxa and representing 54% of the wild and naturalized grasses of the state and Andhra Pradesh arid zone harbours 167 taxa representing 62% of the grass taxa of the state. The dominant grass genus of the study area is Eragrostis with 20 species followed by Digitaria (10 species) and Chrysopogon, Panicum, Sporobolus (9 species). Of the 216 grass taxa, 27 species are found endemic to India, of which 15 are confined to peninsular India. Thirteen grass taxa are new distributional records to south India, Andhra Pradesh and Karnataka. Bracketed keys are provided for the genera and species and infra-specific taxa. Salient features of the genus shared common by the all the species are presented for every genus. Infra-generic taxa are described with a full citation, brief morphology followed by the information on the distribution pattern of the taxon in the world, India and study area, habitat, abundance, phenology and representative specimens. Remarks on taxonomic affinities, ecological variation, nomenclature notes etc. were given wherever necessary.
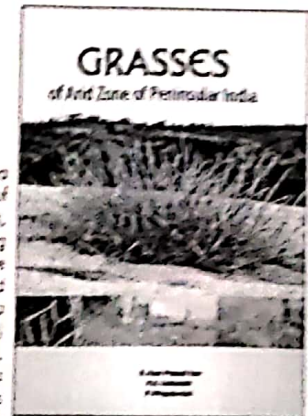
ABOUT THE AUTHOR : Prof. B. Ravi Prasad Rao is the faculty member of the Department of Botany, Sri Krishnadevaraya University, Anantapur. He has 25 years of teaching experience and 30 years research experience in fields of plant taxonomy, ecology, biodiversity conservation and climate change studies. His publications include 14 books and 131 papers. He is the Principal Investigator for 14 research projects. Twenty one students awarded PhD under his guidance and 20 students M.Phil. He was a visiting fellow to Oklahoma State University, USA and a member of SSC, International Union for Conservation of Nature for Indian Subcontinent Plant Specialist Group. He is an expert member in national and state level governmental and non-governmental organizations. He is the 'best teacher awardee' in 2015, conferred by Govt. of Andhra Pradesh.

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Dr. P. Priyadarshini obtained her Ph.D in 2012 from Sri Krishnadevaraya University, Anantapur. She worked as Junior Research Fellow/ Senior Research Fellow and Research Associate in different research projects during 2008-2011 and 2015 in S.K.University and Osmania University respectively. Her publications include 15 papers.

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Grasses of Arid Zone of Peninsular India

B. Ravi Prasad Rao, K.V. Subbaiah, P. Priyadarsini

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Grasses of Arid Zone of Peninsular India

Introduction and Application of Atmospheric pressure in cloud computation

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ABSTRACT : The objective of atmospheric chemistry is to understand the factors that control the concentrations of chemical species in the atmosphere. In this book we will use three principal measures of atmospheric composition: *mixing ratio, number density,* and *partial pressure.* As we will see, each measure has its own applications.

Keywords : Atmospheric pressure, Number density, Partial pressure, Mixing Ratio

Introduction : The *mixing ratio C_X* of a gas X (equivalently called the *mole fraction*) is defined as the number of moles of X per mole of air. It is given inunits of mol/mol (abbreviation for moles per mole), or equivalently in units of v/v (volume of gas per volume of air) since the volume occupied by an ideal gas is proportional to the number of molecules. Pressures in the atmosphere are sufficiently low thatthe ideal gas law is always obeyed to within 1%. The mixing ratio of a gas has the virtue of remaining constant whenthe air density changes (as happens when the temperature or the pressure changes). Consider a balloon filled with room air and allowed to rise in the atmosphere. As the balloon rises it expands, so that the number of molecules per unit volume inside the balloon decreases; however, the mixing ratios of the different gases in the balloon remain constant. The mixing ratio is therefore a robust measure of atmospheric composition.

Mixing Ratios in Gases : Gases other than N_2, O_2, Ar, and H_2O are present in theatmosphere at extremely low concentrations and are called *trace gases.* Despite their low concentrations, these trace gases can be of critical importance for the greenhouse effect, the ozone layer, smog and other environmental issues.

Mixing ratios of trace gases are commonly given in units of *parts per million volume (ppmv or simply ppm), parts per billion volume (ppbv or ppb),* or *parts per trillion volume (pptv or ppt);* 1 ppmv $= 1\times10^{-6}$ mol/mol, 1 ppbv $= 1\times10^{-9}$ mol/mol,and 1 pptv $= 1\times10^{-12}$ mol/mol. For example, the present-day CO_2 concentration is 365 ppmv (365×10^{-6} mol/mol).

A case study of Atompheric pressure on Oceans-cloud computing

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ABSTRACT : Atmospheric scientists partition the atmosphere vertically into domains separated by reversals of the temperature gradient. The *troposphere* extends from the surface to 8-18 km altitude depending on latitude and season. It ischaracterized by a decrease of temperature with altitude which can be explained simply though not quite correctly by solar heating of the surface.The *stratosphere* extends from the top of the troposphere (the *tropopause)* to about 50 km altitude (the *stratopause*) and ischaracterized by an increase of temperature with altitude due to absorption of solar radiation by the ozone layer.

Key Words : Atmospheric pressure, Troposphere, Stratosphere

Introduction : The incomplete combustion of fossil fuels or biomass leads to the formation of carbon-rich (>60%), aromaticresidues (char) and condensates (soot) [*Novakov*, 1984; *Goldberg*, 1985; *Akhter et al.*, 1985]. These residues and condensates, collectively called elemental carbon (EC, usedin atmospheric sciences) or black carbon (BC, used in soil and sediment sciences), seem to be ubiquitous in the atmosphere, marine sediment, soil, and water, and influencea wide range of biogeochemical processes [*Schmidt and Noack*, 2000; *Watson et al.*, 2005]. In this paper we will usethe term black carbon (BC) to imply both BC and EC as originally defined for soil and sediments and atmospheric studies respectively. Readers are encouraged to refer to *Andreae and Gelencsér* [2006] where clear definitions of EC and BC are given. A recent escalation in interest in BC can be attributed to its potential role in global warming. In fact, BC is of interest in this field for two quite different andindependent reasons. First, BC has a direct effect on Earth'sradiative heat balance and visibility [*Crutzen and Andreae*, 1990; *Watson et al.*, 2005]. Here it is the literally the "blackness" of BC that is important. Second, and for the purposes of this paper, BC in soils and sediments is definedas a carbonaceous substance of pyrogenic origin, which is resistant to thermal or chemical degradation under the conditions applied in the methods under discussion. According to estimates found in literature, >80% of BC produced ends up in the soil, where it can reside for hundreds to thousands of years, being relatively resistantto biological and chemical breakdown [*Forbes et al.*, 2006;*Preston and Schmidt*, 2006]. Black carbon therefore repre- sents a pool of C with a long residence time: in essence BCis a carbon sink. For soils and sediments, the light-absorbingcharacteristics of the substance are not part of our definitionof black carbon. What is important is the chemical and thermal stability (and hence longevity) of BC either due to chemical recalcitrance that is evident from its aromatic structure.

MEASURING ATMOSPHERIC PRESSURE :

The *atmospheric pressure* is the weight exerted by the overhead atmosphere on a unit area of surface. It can be measured with a mercury barometer, consisting of a long glass tube full of mercury inverted over a pool of mercury:

A Dimensional Structure Of Fronts In Clouds And Weather Systems As Represented In Atmospheric Science

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Abstract: Atmospheric fronts are a widely used conceptual model in meteorology, most encountered as two-dimensional (2- D) front lines on surface analysis charts. The three-dimensional (3-D) dynamical structure of fronts has been studied in the literaturebymeansof"standard"2-Dmapsandcross-sections and is commonly sketched in3-Dillustrations of idealized weather systems in atmospheric science textbooks. However, only recently the feasibility of objective detection and visual analysis of 3-D frontal structures and their dynamics with in numerical weather prediction(NWP) data has been proposed, and such approaches are not yet widely known in the atmospheric science community. In this article, we investigate the benefit of objective 3-D front detection for case studies of extra tropical cyclones and for comparison of frontal structures between different NWP models. We build on are cent gradient-based detection approach, combined with modern 3-D interactive visual analysis techniques, and adapt it to handled at a from state-of-the-art NWP models including those run at convection-permitting kilometer-scale resolution. The parameters of the detection method (including data smoothing and threshold parameters) are evaluated to yield physically meaningful structures. We illustrate the benefit of the method by presenting two case studies of frontal dynamics within mid-latitude cyclones. Examples include joint interactive visual analysis of 3-D fronts and warm conveyor belt(WCB) trajectories, and identification of the 3-D frontal structures characterizing the different stages of a Shapiro-Keyser cyclogenesis event. The 3-D frontal structures show agreement with 2-D fronts from surface analysis charts and augment the surface charts by providing additional pertinent information in the vertical dimension. A second application illustrates the relation between convection and 3-D cold front structure by comparing data from simulations with parameterised and explicit convection. Finally, we consider "secondary fronts" that commonly appear in UK Met Office surface analysis charts. Examination of a case study shows that for this event the secondary front is not a temperature-dominated but a humidity- Dominated feature. We argue that the presented approach has great potential to be beneficial for more complex studies of atmospheric dynamics and for operational weather forecast.

1. Introduction

The concept of atmospheric fronts, first introduced by Bjerknes(1919), plays a prominent role in meteorology. They are thought of as an interface separating two air masses of different density, mostly caused by temperature differences (Front - Glossary of Meteorology, 2022). Fronts are imaginary surfaces in three-dimensional (3-D) space, however, most commonly they are encountered as two-dimensional (2-D) lines on surface analysis charts, where they still frequently originate from manual analysis of different atmospheric variables. Despite the prevalence of 2-D surface fronts in meteorological practice, several studies have highlighted the impact of the vertical structure of fronts on surface weather(Baderetal.,1996; Browning
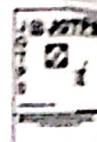
DRUGS ACTING ON RESPIRATORY TRACT

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ARTICLE INFO	ABSTRACT

The function of the lungs in gas exchange which is the transfer of oxygen from the atmosphere to the tissues & the elimination of carbondioxide from the tissues to the atmosphere.symptoms of respiratory diseases (a) sputum (b) cough (c) breathlessness (d) wheeze (e) chest pain .Symptoms of upper respiratory tract diseases (a) Rhinites (b) common cold (c) pharyngitis (d) laryngitis (e) bacterial tracheitis (f) sinusitis.symptoms lower respiratory tract diseases (a) pneumonia(b)pneunsococcal pneumonia (c)legionnaires diseases(d) myco plasma pneumonia(e) staphyloccal pneumonia(f) asthma.therapeutic dose for theophylline is very close to the toxic dose , side effects are headache, insomnia,nausea& vomiting an overdose can lead to the scizures ,brain damage& death. Ipratropium nasal spray is very useful for the treatment of rhinarrhea. When used by inhalation minor fraction gets systematically absorbed which is eliminated in the urine in the form of inactive metabolities.guaifenesin is used to relieve cough secretion due to colds. It acts by virtue of its local pharyngeal effects. So several drugs effects on respiratory tract.
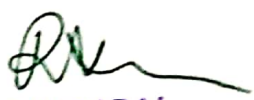
INTRODUCTION:

Lung may be considered as a mass of thing wet epithelium (the alveolar capillary membrane) which allows oxygen (O_2) to diffuse rapidly from the air into a network of capillaries in close contact with the terminal respiratory units contact lungs. At the same time, carbon-dioxide from these capilaries diffuses rapidly in to the air. The function of the lungs is gas exchange which is the transfer of oxygen from the atmosphere to tissues and the elimination of carbon-dioxide from the tissues to the atmosphere. Throughout each lung a network of elastic and collagernous fibrous tissue from a matrix surrounding the capillaries and alveoli.

The fibrous connective tissue prevents over expantion of the all alveoli. The lungs fill but move freely with in the thoracic cage the sealed cavity formed due to the presents of thoracic is known as pleura cavity it is lined with a lubricated membrane, the 'peraietal pluera'. Lungs are also covered with a similar membrane, the viscral pleura so that they slide freely inside the pleural cavity and enlarge when the cavity enlarges. Breathing moments are controlled and coordinated involuntarily by the respiratory center in the medulla oblongata via th lower motor neurones to the inspiratory and expiratory muscles. Trachea contains bands of smooth muscles and the walls of the smaller respiratory

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A Study of Ultrasonic on Binary Liquid Mixture of Toluene with 2, 3 Dichloroethylene at 258.15k

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Abstract-The ultrasonic velocity (u), density (ρ),and viscosity (η) have been measured for the binary liquid mixtures containing toluene with 2,3 dichlorethane at 258.15K. From these data some of acoustical parameters, such as isentropic compressibility(βs) intermolecular free length (Lf), available volume (Va), molar volume(Vm) and Nissan's parameters (d) and their excess values have been calculated. The behavior of these parameters with composition of the mixture has been discussed in terms of molecular interactions between the Components of liquids.

Keywords-Ultrasonic velocity; Acoustical parameters Molecular interaction.

I. INTRODUCTION

In the recent years the ultrasonic studies find extensive applications as sound speed in liquids and liquid systems. Intermolecular interaction in various binary liquid mixtures at different temperatures has been studied by several authors [1 – 4]. The study of pure liquids and their properties can not be altered continuously with in a reasonable range by varying the concentration till an optimum value of some desired parameter is attain. This is only possible by considering the liquid mixtures and solutions which find direct applications in many chemical industries and technological processes. Further such studies as a function of concentration are useful in understanding the intermolecular interactions between the component molecules and more insight in to the structure and bonding associated molecular complexes and other molecular processes. Since ultrasonic velocity is fundamentally related to the bonding forces between the constituents of the medium [5], so it is highly sensitive to the structure and interactions present in the liquid system. The measurement of ultrasonic velocity of sound in liquids enables determination of some useful acoustic and thermodynamic parameters that are found to be very sensitive to molecular interactions. Hence these measurements are useful to study the strength of molecular interactions in liquid mixtures. The thermodynamic studies of binary liquid mixture have attracted much attention of scientist and experimental data on number systems are available from review and publication [6 -10]. Ultrasonic

investigation of liquid mixtures consisting polar and polar components is of considerable importance in understanding intermolecular interaction between the component molecules and they find application in several industrial and technological processes. Many investigations [11 – 20] have been engaged in the task of collecting more and more data and explaining in terms of the properties of pure liquid.

In view of the importance mentioned, at attempt has been made to elucidate the molecular interactions in the mixture of toluene with 2,3, dichloroethylene at 258.15K. Further the excess values of some of the acoustical and thermo dynamical parameters like molar volume (Vm), isentropic compressibility (βs), intermolecular free length (Lf), available volume (Va) and Nissan"s parameter (d)have been calculated from the measurements of ultrasonic velocity, density and viscosity of the mixture. These excess functions are used to explain intermolecular interactions in their binary mixture.

II. MATERIAL AND METHODS

In the present study the chemical used were of analytical grade [E -Merck]. They were purified by recommended methods. The density of pure liquids and liquid mixtures was determined using a pycnometer with an accuracy of ±0.053 % at 308.15K. An Ostwald"s viscometer was used for the viscosity measurement of pure liquid and liquid mixtures. The flow of time of pure liquid and liquid mixtures were measured using an accurate stopwatch with a precision of ±0.15. Density and viscosity measurements were carried out using a thermostatically controlled well-stirred water bath to maintained temperature. The speed of sound waves ware obtained by using ultrasonic interferometer model M – 84 at 2MHz frequency. All measurements were made in a thermostatically controlled water bath with temperature accuracy of ±0.10 C. The molar volume of binary liquid mixture is given by

$$Vm = [X1M1 – X2M2] – \rho \text{ ---------- (1)}$$

Where Vm is molar volume, M1 and M2 are molecular weight of pure compounds and X_1, X_2 are mole fractions ofthe component 1and 2, ρ is the density of liquid. The isentropic compressibility (βs) and molecular free length (Lf)are calculated using following methods $\beta s = 1/u2\rho$ ---------------- (2)

67. Study of rate of polymerization of acrylonitrile in Ce(IV) – lactic acid redox system with cyclic oligosaccharide.

A. Kavitha; Manonmanium Sundaranar University, Abishekkapatti, Tirunelveli, Tamil Nadu;   Dr.M.C. Duraimanickam; A.P.A. College of Arts & Culture, Palani, Tamil Nadu

68. Asymmetric Synthesis of Baylis-Hillman Reaction

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69. A NEW CONTROL METHOD FOR DC MICROGRIDS TO REDUCED DC FAULT CURRENT IN   DISTRIBUTION POWER SYSTEM

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70. Influence of Cu^{2+} Ions on the Structural, Optical and Magnetic Properties of Semiorganic L-Alanine Cadmium   Chloride Single Crystal
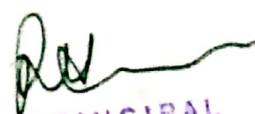
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Shabu. R; Scott Christian College (Autonomous), Nagercoil

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M.Alagar; Mannar Thirumalai Naicker College, Madurai, Tamil Nadu

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D.Veerappan, D. Suresh kumar, C. Settu, S. Sugesh; Narasu's Sarathy Institute of Technology, Salem, Tamilnadu

66. A case study of Excess Thermodynamic Parameters in Binary Liquid Mixtures of ethyl-2-butanol with aldehyde

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Rainfall Intensity on clouds in atmospheric pressure Frequency

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A B S T R A C T

The design of flood control structures requires rainfall intensity estimation for design discharge computation. To make the rainfall intensity values easily available in Warri, Delta state of Nigeria, this research developed rainfall models. Rainfall intensity data were collected and analysed. The statistical method of least squares was used to fit the curves generated. Intensity- duration models were developed and presented in graphical curves. Quotient method was adopted in the modeling. Another set of models developed are intensity-frequency models which gave correlation coefficient values of be- tween 0.8694 and 0.9689 showing good fit. These models were used to pro- duce rainfall intensity values for durations of 30, 60, 90 and 120 minutes and some return periods between 5 years and 30 years.

Keywords:
Rainfall Intensity, Intensity-Frequency Model,Least Squares, Correlation Coefficient

1.   Introduction

Rainfall has many characteristics that affect plan-ning. The relative amount of rain, their seasonal timing, and the sizes and intensities of individual storms, for example, affect activities as different as city budgeting for drainage design and seasonal runoff forecasting for hydro-electric power or irrigation. For other planning purposes such as dealing with regional water manage- ment or choice of crops, one may have to focus on sea- sonal and annual totals of precipitation and their reliabil-ity. Still other planning situations require information onthe magnitude and intensity of individual rainfalls for the design of engineering structureDifferent characteristics of rainfall are important to specialists in various fields and therefore the number of ways of analyzing rainfall data is virtually unlimited. The method chosen depends upon the nature of the available data and the purpose of the investigation. At most stations, only daily totals of rainfall are measured. These totals may refer to several storms during a day or to a part of one storm that bridges two measuring peri- ods. In this case the records are a somewhat artificial and inaccurate description of precipitation. The only characteristics of rainfall that can be gleaned from such data are those pertaining to specified intervals of time, such as days, months, seasons, or years [7]. A relatively small amount of rainfall-measuring stations are equipped with continuous recording gauges, which yielddata on the characteristics of individual storms such as timing and intensity as well as total amount [2].

Another consideration in choosing appropriate methods of analysis is the particular planning problem for which a description of the rainfall regime is required. Ecologists and Agronomists may be interested specifi- cally in seasonal totals, the frequency of small amounts of rain or the probability of droughts for their studies of crops or natural plant populations. Civil engineers con- centrate on the intensity, duration and areal extent of the large, infrequent storms that challenge the design of their structures. Extreme value distributions have widelybeen used in hydrology [1].

The major difficulty encountered by engineers and hydrologists in planning and design of water re- sources structures in the developing nations such as Ni- geria is the unavailability of the required long term rain- fall data. While rainfall records of many years and con- sequently, rainfall frequency atlas are commonly avail- able in developed countries such as United States of America, Nigeria cannot boast of a consistent 30 year rainfall record. Previous studies on rainfall intensity in south-east Nigeria were based on the generalized accu- mulated rainfall patterns [6].

The first extensive rainfall frequency analysis in the United States of America was made by Yarnell [9]. This study yielded a set of 56 isohyetal maps of the con-tinental United States, covering the range of durations of5, 10, 30, 60 and 120 minutes for 2 year frequency. Withthe passage of time more rainfall data were collected and thus, detailed rainfall frequency atlas of the United States was published by U.S weather Bureau [3].

Chemical characterization of rainwater at a developing clouds of Atmospheric Science

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Abstract

A comprehensive study of the chemical composition of rainwater was carried out from June 1999 to September 2001 at Lucknow, India. The rainwater was found to be alkaline with a mean pH of 6.7 in winter season and 6.5 in monsoons. It was observed during the study that Ca was the most abundant ion and along with Mg and NH_4 it forms equilibrium reactions with acids. Analysis of Variation (ANOVA) indicates that concentration of major ions was higher during cold climatic conditions probably due to dry season in winter leading to low dilution phenomena. The data was subjected to factor analysis based on Principal Component Analysis using the SPSS software (Version 7.5). The rotated factor matrix was employed to group variables into four factors. The first factor included Ca, Mg, SO_4, NO_3 and NH_4 attributed to soil derivatives and biogenic activities. Factor 2 loaded with Na, K, and Cl, may be linked to emissions from traditional combustion activities. Factor 3 and 4 include Cu, Zn, Fe and Ni, which may be attributed to industrial activities and scavenging process cycles.

Keywords: Factor analysis; Precipitation; Source apportion; ANOVA

1. Introduction

Removal of gases and aerosols from the atmosphere has an important role in inter- reservoir transfer mechanisms. Air-borne particulate matter, emitted from natural and anthropogenic sources is transported, diluted and scavenged by wet removal cycles or de- posited by complex bio-geochemical mechanisms, primarily sedimentation. The impact of wet deposition is plays significant role due to cleansing of the atmosphere on one hand and on the other, has direct impact on ecosystem and human artifacts (Goncalves et al., 2003). The composition of wet deposition actually reflects the composition of the atmosphere through which it falls. Analysis of precipitation quality helps to evaluate the relative importance of the different sources for gases and particular matter. Despite exhaustive research having been carried out already, on precipitation chemistry and acid deposition mechanisms(Galloway et al., 1993; Lee et al., 2000; Hu et al., 2003; Kulshrestha et al., 2003), yet, no single protocol or reaction cycle can be proposed for the event. This is because the quality gradient of rainwater is a highly sensitive process, dependent on land topology, microclimate and anthropogenic conditions, thus becoming highly susceptible varying considerably from site to site and region to region. The chemical profile of precipitation is dependent greatly on phenomena like source apportion. On one hand fossil fuels cause acidic depositions while on the other dust particulates, especially in the Indian subcontinent, contribute base cations. Therefore, both anionic and cationic indexes are necessary to evaluate the overall characteristics of rainwater.

Considering the importance and consequences of acid rain, the present study, has been carried out at the rooftop of a premier research Organization viz. Central Research Institute in Lucknow, a rapid developing and large city in the Northern-Central part of India.

Assessment of Heavy Metal Accumulation in Hundri River Bank in Kurnool, Andhra Pradesh

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Abstract: *In this study we analyzed and estimated heavy metal accumulation in hundri river sludge and control (normal fertile soil) quantitatively along with their physical and chemical properties (pH, Temperature, Moisture content, Organic carbon, Nitrogen, Phosphorus and Potassium). Results showed that river sludge shows high pH, low temperature, high organic and NPK than control soils. Our study found eight heavy metal components namely Ag, Co, Cu, Cr, Ni, Cd, Zn, and Pb) in both river sludge and control soil. However river sludge showed high amount of all eight heavy metal accumulation than control soils when compared with toxic level standards. Detailed results and discussions were explained below.*

Keywords: Heavy metals; Pollution; Hundri River; sludge; organic matter

1. Introduction

Water is essential components for each and every life form. Crop productivity and development depending on water and soil fertility. Water bodies especially rivers are one of the important natural resource on earth to agriculture as well as human beings. They provide habitat for numerous aquatic lives and help in conserving the biodiversity (Rawat et al., 2017). Now a day's most of the rivers and canals get pollution by adding hazardous chemicals, fertilizers, by industrialization and urbanization. Among soil pollution heavy metal accumulation was one of the serious tasks, because heavy metals enter human and animal bodies through food chain and cause serious health hazards (Williams and David, 1973; DMello, 2003; Abdollatif et al., 2009).

In recent years high concentrations of heavy metals are entering the aquatic system due to the injudicious and unprogrammed discharge of industrial wastes, agricultural effluents and sewage waters, and indirectly from aerial fallout, bioaccumulation of metals in the eutrophicated sections (Mapanda et al, 2005). Due to these activities most of the perennial fresh water rivers like ganga, Krishna, hundri etc, getting pollution. Its leads to accumulation of heavy metals and also changing the soil physical and chemical composition like turbidity Edwards, (1991); Sharma et al., (2000). Plants and vegetables take up heavy metals by absorbing them from contaminated soils and waste water used for irrigating them as well as from deposits on different parts of the plants exposed to the air from polluted environment (Yadav et al 2002). Many urban areas in india grown common leafy vegetables like amaranths, spinach etc under municipal/industrial slugged water (Allen et al, 1986). So heavy metal easily enters human and animal bodies through food chain, it is the major pathway of heavy metal exposure for humans Zemede Asfaw (1992). This causes an increase in the concentration of heavy metals content in human bodies.

The present study we concentrate on estimation of heavy metal accumulation in hundri river bank. because now Hundri River is used as open waste disposal site in kurnool district, Andhra Pradesh. Apart from its unfortunate fact, the river is also still used for various purposes including irrigation and animal drink. (Chen et al, 2005; Singh et al, 2004). The objective of present study is to assess heavy metal pollution/accumulation in sediments of hundri river bank and control soils.

2. Materials & Methods

Study Site and Sampling

Hundri River is a lifeline for the people of the districts Kurnool, Andhra Pradesh. Soil Samples (slugged and control) soils were collected from hundri river bang and surrounding normal fields. Samples were collected from 5 to 10 cm depth of the middle of the river or the bank of the running water channel and control (normal agricultural fields in Kurnool surroundings). The sediment and control soil samples (300gm) were collected in impenetrable polythene bags with the help of the bed material sampler. All the collected samples were transported to the lab and air dried for 72 h, ground in a mortar, sieved and homogenized before each weighing. Testing instruments were washed with double-distilled water and dried before use.

Preparation of sediment samples

A total digestion method (Allen et al, 1986; modified by Singh et al. 2010) was utilized to determine the heavy metals concentrations in both sediment and control samples, in which 2 gm of each sample was warmed with 20 ml of tri-acid mixture (HNO_3, H_2SO_4 and $HClO_4$) in the proportion of 5:1:1 in a Teflon measuring beaker at $80^{\circ C}$ for 4–5 h. At the point when the samples totally digested and leave a transparent solution, the sample was cooled to room temperature and after that it was filtered through Whatman No. 42 filter paper into a pre-cleaned 100-ml volumetric flask. These samples were specifically utilized for the investigation of heavy metals by atomic absorption

A Study on Heavy Metal Accumulation in *Spinacia Oleracea* L. Grown in Hundri River Bank in Kurnool

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Abstract

Developing countries like India heavy metal accumulation was increased in urban and industrial areas. Contamination of heavy metals represents one of the most pressing threats to water and soil resources, as well as human health. In the present study we estimated heavy metals (Cd, Cr, Pb and As) accumulation quantitatively in Spinacia oleracea grown under hundri sludge as well as control samples. Our study reveals that sludged samples found more heavy metal accumulation than controls. More over heavy metal accumulation was more in Spinacia root tissue than shoot and leaf tissue. Detailed results and discussions were explained below.

Keywords

Heavy metals; Pollution; Hundri River; plant-availability; Phytotoxicity.

*****

INTRODUCTION:

Vegetables constitute essential diet components by consisting carbohydrates, proteins, vitamins, iron, calcium and other nutrients that are highly beneficial for maintaining health and also preventing diseases. They also contain both essential and toxic elements over a wide range of concentrations. Until recently vegetables did not constitute as major part of the Ethiopian diet. In addition, there is an annual cycle of shortage of grains in some parts of Ethiopia, where families exhaust their grain supply before the next harvest; then they heavily supplement their food intake with leafy vegetables [1, 2].

Leafy vegetables are playing a important role in a human diet, because of their nutritional values. During recent years their consumption is increasing gradually, particularly among the urban community. But the cultivation of leafy vegetables like Spinacia, Amaranthus ect, were cultivated in sludge water instead of rain/cannel water in urban areas. The Industrial or municipal water sludge is the major source of heavy metal contamination/pollution. Because heavy metal existence is mainly due to anthropogenic sources such as industrial and agricultural activities [3]. This causes an increase in the concentration of heavy metals content related to soil and water, thus contaminating them. The increased uptake of these metals by plants influence the natural contents of vegetables and thus poses serious health impacts.

Heavy metals are potential environmental contaminants with the capability of causing human health problems such as cancer, mutations, or

India – Pakistan Relations: It's Impact on Jammu & Kashmir State in India

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ABSTRACT:

India and Pakistan has the conflict over the Jammu and Kashmir issue and with the People's Republic of China, India had boundary dispute. India passionately committed to a secular and democratic State and the possession of Kashmir is very important as a demonstration that the Muslims and Hindu can live together peacefully. The impact of the Kashmir issue could be observed in India's relations with other Asian countries. There is a highly developed rivalry between India and Pakistan. This rivalry had vitiated the atmosphere of both the countries. The Asian countries had tried to maintain an attitude of neutrality towards the Kashmir conflict. The impact of the Kashmir issue and the highly developed rivalries between India and Pakistan vitiated the atmosphere of the sub-continent. Kashmir is a multi-ethnic region with several internal sub regions, whose inhabitants have distinct political goals; Pakistani Kashmir consists of Azad Kashmir and Gilgit-Baltistan, jurisdictions that want to become formal provinces of Pakistan to gain more political autonomy over their internal affairs. Indian Kashmir includes Jammu, Ladakh and the Kashmir Valley. While the first two regions desire to remain part of India, the Muslim-majority Kashmir Valley wants independence from it. This paper describes the India – Pakistan relations and its impact on Jammu and Kashmir State in India.

Keywords: India, Pakistan, Jammu and Kashmir issue, Rivalry, Muslims and Hindu, the Asian Countries, Political goals

INTRODUCTION:

The Kashmir issue has caused tension and conflict in the Indian subcontinent since 1947, when independence from Britain created India and Pakistan as two sovereign states. Jammu and Kashmir – the full name of the princely Himalayan state, then ruled by Maharaja Hari Singh - acceded to India in 1947, seeking military support after tribal raids from Pakistan into the state's territory.

The State of Jammu and Kashmir constitutes the three distinct geographical regions, which widely differs from each other in terms of their Physical frame work, Socio- Economic conditions, Religio-Cultural and even in Political conditions, which roughly corresponded to the following geographical divisions:

- The Jammu Province, which had been the heartland of the Dogra control in the Punjab
- The province of Kashmir, which was included in the State when Maharaja Gulab Singh paid the war indemnity on behalf of Sikhs to the British in 1846 A.D.
- The Province of Ladakh and Baltistan, the former conquered by the Dogras in 1834 A.D and the latter in 1840 A.D.

Obstacles and Opportunities for Women in the Political System

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ABSTRACT:

Women's political participation now is very reassuring contrast to the older times. Today it stays more grounded than at any other time. But, in India, women who have basic leadership controls constantly hail from urban and tip top gatherings. Even today, the representation of women in Indian Parliament is far from satisfactory. Women have been demanding for more space in legislative bodies. The root of political participation of women can be traced back to 19th-century reform movements. Social reformers like Rajaram Mohan Roy, Ishwar Chandra Vidyasagar, Mahadeva Govinda Ranade, Behramji Malabari believed that social evils could be eradicated by raising consciousness and educating women. The Constitution of India ensured justice-social, economic and political, liberty of thought, and equality to all citizens. Constitution has given to equity of women and considered State to take measures to neutralize the socio-economic, educational and political drawback faced by women. Gender stereotypes which perceive women as weak representatives should be changes through awareness and education. Efforts need to be taken to enhance the participation of women in governance in large numbers. This paper describes the obstacles and opportunities for women in the political system.

Keywords: Women, Political participation, Indian Parliament, Liberty of thought, socio-economic, education

INTRODUCTION:

In India, political participation of women is not impressive when compared with men. This is the case in most of the countries across the world. Women in India participate in voting, run for public offices and political parties at lower levels more than men. Political activism and voting are the strongest areas of women's political participation. To combat gender inequality in politics, the Indian Government has instituted reservations for seats in local governments.

Women turnout during India's parliamentary general elections was 65.63%, compared to 67.09% turnout for men. India ranks 20th from the bottom in terms of representation of women in Parliament. The Constitution of India attempts to remove gender inequalities by banning discrimination based on sex and class, prohibiting human trafficking and forced labor, and reserving elected positions for women.

The Government of India directed state and local governments to promote equality by class and gender including equal pay and free legal aid, humane working conditions and maternity relief, rights to work and education, and raising the standard of living. Women were substantially involved in the Indian independence movement in the early 20th century and advocated for independence from Britain. Independence brought gender equality in the form of constitutional rights, but historically women's political participation has remained low.

A STUDY ON ADMINISTRATION AND WORKING OF MGNREGS : ITS IMPACT ON COUNTRYSIDE OF KURNOOLDISTRICT OF ANDHRA PRADESH

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ABSTRACT:
Labour is the main asset for the vast majority of the poor in India and as a result expanding employment opportunities should be the focus for not only sustained poverty reduction but also for improvement in human development. The absolute number of unemployed and underemployed has consistently increased in spite of the fact that there was an improvement in the gross domestic product of the economy.Agriculture has proved to be a losing proposition in the country. The larger agrarian crisis has a terribly adverse effect on farm households. The increasing numbers of farmers committing suicides reflect the symptom of this crisis. Because of the failure of agriculture, which happens to be the largest employer in the rural areas, unemployment and underemployment are quite rampant in the rural areas and it is incumbent upon the government to address this issue. It was perceived that there was a dire need for programs that generated employment directly and wage income to the poor. Especially, during the absence of opportunities of employment in the rural areas, these employment generating programs provided income transfers to the poor in India. Many schemes have been conceived of and implemented for the welfare of the weaker sections of the society since independence. Hence, we can say that India has a protracted history and experience in implementing wage employment programs. The National Rural Employment Generation Act 2005 (NREGA) makes a clear departure from the previous employment generation programs. It is unique in the sense that MGNREGA being an Act is also a right. It has a 'rights-based' framework which gives a legal guarantee for work, as opposed to a typicalgovernment program which could be withdrawn at will by a government.

KEYWORDS: National Rural Employment Guarantee Act, employment opportunities, agriculture, Rural areas, Weaker sections, livelihood security.

STATEMENT OF THE RESEARCH PROBLEM

The Mahatma Gandhi National Rural Employment Guarantee Scheme should not be a charity/welfare program. If it is a mere welfare program, the implementation completely depends on the government's political will. If it is a rights-based program,it has to be implemented as per the provisions of whatever is mentioned in the Act. In our Constitution, we created a lot of legal rights ourselves after independence. In reality, however, there is a wide gap between the rights and their realization. The pertinent question is if NREGA is a right, how does the poor use this right? How is the poor going to know that they now have a right to employment? Even if they know, can they demand it? Has the government set up the system to respond to a demand-driven system? Also, the long-term impact of the program on poverty in terms of income effects and sustainability (ability to retain above power) remains an interesting aspect. For the implementation of MGNREGA, the key body is Gram Panchayat at the bottom. The Gram Panchayat should play a pivotal role in the implementation of the

Power series expansion of axially symmetric toroidal harmonics for toroidal ion trap

Appala Naidu Kotana [a] ✉, Atanu K. Mohanty [b] ✉

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Abstract

This study presents a method to obtain power series expansions of toroidal harmonics in terms of radial and axial distances from the trapping circle. In order to obtain the power series expansion of individual toroidal harmonics, three-term recurrence relations are derived, which involve toroidal harmonics of order $n - 1$, n, $n + 1$ and derivative of toroidal harmonic of order n. Using these three-term recurrence relations a systematic procedure is presented to obtain the power series expansion for a toroidal harmonic of arbitrary order, up to the desired number of terms. With this procedure, the power series expansions of toroidal harmonics till order 5 are presented.

Verification of this theory was carried out on an arbitrary toroidal ion trap. The potential and the trajectory of a singly charged ion of 78 Th obtained by the power series were compared with those computed using the Boundary Element Method (BEM). The match was found to be very good.

Graphical abstract
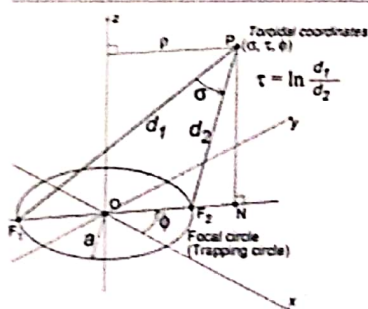
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Introduction

Toroidal ion traps are a new class of ion traps described in Ref.[1]. Toroidal ion traps consist of electrodes which are obtained by rotating cross-section of point trapping devices such as truncated Quadrupole Ion Trap (QIT) [2] or the Cylindrical Ion trap (CIT) [3] about an axis not passing through the trapping center.

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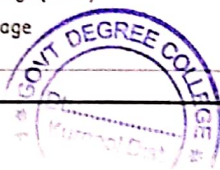
22

Impact of concentrations and chemical species on Atmospheric pressure

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ABSTRACT: Reactions in the atmosphere can lead to the formation and removal of species. Winds transport atmospheric species away from their point of origin. All material in the atmosphere is eventuallydeposited back to the Earth's surface. Escape from the atmosphere to outer space is negligible because of the Earth's gravitational pull. Deposition takes two forms: "dry deposition" involving direct reaction or absorption at the Earth's surface, such as the uptake of CO_2 by photosynthesis; and "wet deposition" involving scavenging by precipitation.

Key Words : Winds Transport, Gravitational pull, Dry deposition, Photosynthesis.

Introduction : A general mathematical approach to describe how the above processes determine the atmospheric concentrations of species will be given in chapter 5 in the form of the *continuity equation*. Because of the complexity and variability of the processes involved, thecontinuity equation cannot be solved exactly. An important skill ofthe atmospheric chemist is to make the judicious approximations necessary to convert the real, complex atmosphere into a *modelsystem* which lends itself to analytical or numerical solution. We describe in this chapter the two simplest types of models used in atmospheric chemistry research: *box models* and *puff models*.

As we will see in chapter 5, these two models represent respectively the simplest applications of the Eulerian and Lagrangian approaches toobtain approximate solutions of the continuity equation. We will also use box models in chapter 6 to investigate the geochemical cycling of elements.

ONE-BOX MODEL

A one-box model for an atmospheric species X is shown in It describes the abundance of X inside a box representing a selected atmospheric domain (which could be for example an urbanarea, the United States, or the global atmosphere). Transport is treated as a flow of X into the box (F_{In}) and out of the box (F_{out}). If the box is the global atmosphere then $F_{in} = F_{out} = 0$. The production and loss rates of X inside the box may include contributions from emissions (*E*), chemical production (*P*), chemical loss (*L*), and deposition (*D*). The terms F_{In}, *E*, and *P* are *sources* of X in the box; the terms F_{out}, *L*, and *D* are *sinks* of X in the box. The mass of X in the box is often called an *inventory* and the box itself is often calleda *reservoir*. The one-box model does not resolve the spatial distribution of the concentration of X inside the box. It is frequently assumed that the box is well-mixed in order to facilitate computation of sources and sinks.

Concept of lifetime

The simple one-box model allows us to introduce an important andgeneral concept in atmospheric chemistry, the *lifetime*. The lifetime
t of X in the box is defined as the average time that a molecule of X remains in the box, that is, the ratio of the mass m (kg) of X in the box to the removal rate $F_{out} + L + D$ (kg s^{-1}):

A study on Vertical Structure of Marine Atmospheric Boundary Layer over Pacific Ocean

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Abstract:

We are carrying out research at Palau Islands focusing on the Pacific Area Long-term Atmospheric observation for Understanding of climate change (PALAU) project to understand the mechanism of cloud-precipitation processes, land-atmosphere and air-sea interactions over the warm water pool, focusing on seasonal and intra-seasonal variations. We installed several ground based remote sensors at Peleliu and Aimeliik experimental sites in the Palau. For the present study, Wind Profiler Radar (WPR) is utilized for understanding of the marine boundary layer (MABL) evolution, diurnal and seasonal variation of precipitating cloud systems associated with easterly and westerly monsoon. In the present study, long-term (four year) observations of the marine boundary layer height using wind profiler radar are utilized to estimate ventilation coefficient, a critical parameter in determining air pollution concentration near the surface which signifies the ability for natural ventilation of air over Palau in Tropical Western Pacific Ocean during the period from April 2003 to March 2007. In addition, MABL observations revealed that well-distinguishable features during westerly, easterly and transition period.

Key Words: Marine atmospheric boundary layer (MABL) ; Wind profiling radar;

1. Introduction:

The dynamics of the Marine Boundary Layer (MABL) is a complex problem involving oceanic and atmospheric processes as well as interactions at the air-sea interface. Progress towards improving the theoretical understanding of the MABL has been hampered not only by the difficulty of modeling these often nonlinear processes and interactions but also by the difficulty of carrying out experimental programs at sea. Furthermore, the role of intermittent and directional processes is now beginning to be addressed, and a better understanding of these processes is viewed as critical in determining air-sea fluxes of momentum, heat, and moisture. Due to lack of direct measurements of boundary layer height and of suitable measurements that could be used to estimate it [1], the boundary layer height is less common in the climatological literature. This problem may be partially remedied through analysis of new data sources like observations by radio occultation measurements from global navigational satellite systems [2,3], aerosol observations from satellites [4], Lidar[5] and Sodar[6]. Other types of observations, including Wind-profiling and boundary layer Radar[7,8] and Ceilometer[9] have been used to estimate boundary layer height. During the past two decades Doppler wind radar profilers (WPR) that operate near 1 GHz have been use in boundary layer dynamics and precipitation research. The advantage of this WPR is to measure directly the vertical wind component within a convective environment. Hence, WPR has been used extensively used in numerous

Discerning precipitating Clouds for Bright band characterization over Kadapa, Semi-arid regions of India

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A Micro Rain Radar (MRR) and a PARSIVEL Disdrometer have been operated at a semi-arid-region, Kadapa (8.5° N, 76.9°E). The rain Drop Size Distribution (DSD) from the MRR has been evaluated using disdrometer data and found agreement. Rainfall data from both these instruments have also been evaluated using a manual rain gauge. The DSD and the integral rain parameters up to an altitude of 6400 m with a height resolution of 200 m, and also the signature of radar bright band are obtained from the MRR. The radar Bright Band signature, which is an indication of freezing height, is validated using GPS sonde over Kadapa and the Wyoming radiosonde data. The whole precipitating cloud events from from January 2010 to December 2015 were separated in to Bright Band (BB, Stratiform Clouds) during South West Monsoon (SWM) and North East Monsoon (NEM). Since the radar BB signature is an indication of rain originated from stratiform (convective) clouds, and along with the corresponding simultaneous distinct slope of the Z-R relation gives a novel clear-cut conjunctive methodology for the classification of tropical precipitating clouds in to stratiform or convective using a low-cost Ku-band Radar.
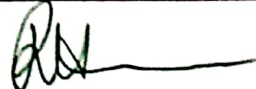
Key Words: *Rain microstructure; stratiform; convective rain; micro rain radar; bright band signature; Tropical semi-arid region,.Rainrate, Radar Reflectivity, Raindrop Concentration.*

1. Introduction:

Knowledge of attenuation by the melting layer will be crucial in order to estimate rainfall using short wavelength space borne radars. Hence, characteristics of the melting layer are not only important for understanding the microphysical processes involved in rainfall mechanism but also necessary for rain retrieval algorithms used for the present and future space-borne rain radars such as Tropical Rainfall Measuring Mission (TRMM) precipitating radar (PR) and Global Precipitation Mission (GPM). With the Tropical Rainfall Measuring Mission (TRMM) satellite, more data about the melting layer have been available in tropics. *Thurai et al. (2003)* show that there is a significant variation of melting layer height with the latitude.

Information about melting layer height and thickness in tropical regions, especially in the semi-arid region of India, has been particularly sparse due to the lack of experimental data. In the present study, BBH measurements are made with a ground based high resolution vertically profiling Micro Rain Radar (MRR). However, these measurements will allow us to derive the dependence of bright band characteristics on

Large Hemispheric Differences In The Atmospheric Science Due To Cloud Coupling

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INTRODUCTION

The Hadley circulation plays a central role in controlling the meridional distribution of temperature, humidity, and precipita-tion at low latitudes. Thus, changes in the strength and position of the Hadley cell have large climate impacts in tropical and subtropical regions. For example, the projected weakening of the Northern Hemisphere (NH) Hadley cell and widening of the Southern Hemisphere (SH) Hadley cell in coming decades will affect the strength and position of the hydrological cycle both at semi-arid regions and in the deep tropics[1-4]. On shorter time- scales, the interannual variability of the Hadley cell was argued to modulate the equatorial atmospheric heat transport, the location and strength of the Inter-Tropical Convergence Zone (ITCZ), and the activity of tropical cyclones[5-7].

While changes in the Hadley cell over different timescales may stem from different mechanisms[4,8], over a wide range of timescales, ocean coupling was argued to affect the Hadley cell's behavior. For example, on intraannual timescales dynamic ocean coupling (i.e., the effect of changes in ocean heat flux convergence, OHFC) was found to weaken the tropical circulation and to generate the strong asymmetry between the summer and winter tropical circulations and precipitation[9]. On multidecadal timescales, OHFC was found to reduce the projected (by 2100) weakening of the circulation by ~ 60% (via both horizontal ocean heat transport and vertical heat uptake) and the widening of the circulation by 30% (mostly via oceanic heat uptake)[10,11]. Similarly, via ocean coupling processes, the projected melting of Arctic sea ice by the end of this century was shown to have a significant effect on the Hadley cell. In response to the projected sea-ice loss, while thermodynamic ocean coupling was found to expand and weaken the Hadley cell, dynamic coupling was found to contract and strengthen the circulation[12-14].

On interannual timescales, previous studies suggested that ocean coupling also plays an important role in the Hadley cell's variability. For example, the El Nino-South Oscillation (ENSO) was argued to affect the interannual variability of both the Hadley cell width[15-18] and strength[19-24], mostly over the Pacific, and mostly

the symmetric component of the circulation around the equator. It should be noted that mid-latitude eddies were also argued to affect the variability of the Hadley cell strength, mostly in the NH[24-26].

Interestingly, using NCEP reanalysis, the interannual variability of the NH Hadley cell strength was shown to be smaller than the variability of the SH Hadley cell strength[27]. This hemispheric difference deserves further investigation, as not only it breaks the expected hemispheric symmetry in the atmospheric flow, but it also points to the different climate impacts of the Hadley cell variability in the two hemispheres; recall that the Hadley cell strength has a large effect on the precipitation intensity over the ascending and descending branches of the circulation, and on the temperature distribution in the tropics. A leading potential process to explain any hemispheric difference in the large-scale atmospheric flow is ocean coupling. Thus, given the important role of ocean coupling in the Hadley cell strength variability, we here examine the role of ocean coupling in the different hemispheric variability of the Hadley cell strength. In particular, we revisit this hemispheric difference, corroborate its existence using multiple reanalyses and state-of-the-art climate models, and use a hierarchy of ocean coupling experiments. Such hierarchy allows us to investigate and better understand the relative roles of ocean coupling, and its dynamic and thermodynamic compo- nents, in the different variability of the circulation in the two hemispheres.

RESULTS

Quantifying the role of ocean coupling in the different hemispheric Hadley cell's variability

We start by assessing the different interannual variability in the annual mean SH and NH Hadley cell strength (Ψ_{max}, Methods) over recent decades in the Coupled Model Intercomparison Project Phase 5 (CMIP5) and Reanalyses (Methods). This is done by calculating the difference between the variance of the detrended NH (σ^2_{NH}) and SH (σ^2_{SH}) Ψ_{max} time series over 1979–2017, relative

Thermodynamic properties of binary liquid mixtures of Ethylene Glycol (EG) with different amines at 308.15KΨ

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Abstract : Densities and viscosities of the binary liquid mixtures of Ethylene (EG) + n-butylamine (NBA), + sec-butylamine (SBA) + tert-butylamine (TBA), + n-hexylamine (NHA), + n-octylamine (NOA) and + cyclohexylamine (CHA) have been measured at 308.15K. From the experimental results the excess molar volume (V^E), excess viscosities (η^E), and excess molar Gibbs free energy of activation of viscous flow (G^{*E}) have been computed as a function of composition. The parameter d^1 of the Grunberg and Nissan expression has been computed. The values of V^E are negative whereas the values of η^E, G^{*E} and d^1 are positive. Deviations from the ideal behavior are discussed from the point of view of the molecular interactions present between the unlike molecules. The strength of these interactions is related with the chain length of the amines. The results are discussed in terms of the theories of non-electrolyte solutions.

IndexTerms - molar volume , Nissan expression , viscosities.

I. INTRODUCTION

Viscosities and desitites for the binary liquid mixtures of Ethylene Glycol (EG) with a number of amines have been taken up for the first time for measurements. The results obtained for the systems of Ethylene Glycol + n-butylamine (NBA), + sec-butylamine (SBA) + tert-butylamine (TBA), + n-hexylamine (NHA), + n-octylamine (NOA) and + cyclohexylamine (CHA) are reported in this paper.

Densities and viscosities of the systems mentioned were measured at 308.15K. Excess functions like, excess molar volume (V^E), excess molar free energy of activation of viscous flow (G^{*E}) and Grunberg and Nissan interaction parameter (d^1) were calculated from the experimental results at different mole fractions of Ethylene Glycol (EG). The values obtained are discussed in terms of molecular interations

II. RESULTS AND DISCUSSIONS

The measured density (ρ) and viscosity (η) data for mixtures of ethylene glycol (EG) + n-butylamine (NBA), + sec-butylamine (SBA), + tert-butylamine (TBA), + n-hexylamine (NHA), + n-octylamine (NOA) and + cyclohexylamine (CHA) are used to calculate the excess molar volume (V^E), excess viscosity (η^E), excess Gibbs free energy of activation of viscous flow (G^{*E}) and Grunberg-Nissan interaction parameter (d^1) and the results are presented in Tables 1 to 4

The variation of these parameters η, V^E, η^E, G^{*E} with mole fraction of Ethylene Glycol (X_{EG}) for the systems under study are graphically shown in Figs. 1 to 4 respectively.

As expected, pure EG has the highest viscosity (Tables 1 to 6) than all the other amines. Fig. 1 shows the variation of viscosity of these binary systems with mole fraction of Ethylene Glycol (X_{EG}). It is observed that greater viscosity is obtained in Ethylene Glycol rich region and is in consistence with the idea that the molecules of Ethylene Glycol are strongly self-associated.

A perusal of Fig. 1 reveals that as the mole fraction EG increases, the possible hydrogen bonding and dipole-dipole interactions between EG and amine molecules-overrides. The dissociate effect leading to a sharp increase in dn/dc values. Moreover, the sharp increase in η and x, principally in EG rich region. This is supported by the view[27] that viscosity of a system is determined mainly by the bulky are less mobile entities of the system. One can assume the existence of bulky entities, EG-Amines, which might involve hydrogen bonding between unlike molecules and also the entities EG-EG in EG rich mixtures owing to its tendency to preserve structural order.[28]

It is further observed from the Fig. 1 that the viscosity of these mixtures varied non-linearly with increase in Ethylene Glycol content, which indicates the presence of intermolecular interactions between components.

It is clear from the Fig. 2 that the negative V^E values are obtained over the entire composition range for all these systems which indicates the presence of strong molecular interactions between the components of the mixture. It is also observed from the Fig. 2 and Tables 1 to 6 that the numerical values of V^E fall in the sequence.

$$EG + TBA < + SBA < + NBA < + NHA < + NOA < + CHA$$

From Fig. 2, it is further observed that V^E values become less negative as the chain length in amines increase. The negative V^E vs X_{EG} plots were found to be large and unsymmetrical with maxima between 0.4 to 0.5 mole fraction of Ethylene Glycol.

Several effects may contribute to the value of V^E and three different effects may be considered as being important.

(a) break up of hydrogen bonds and dipolar interactions in Ethylene Glycol and intermolecular hydrogen bonded interactions in amines,

(b) interstitial accommodation of one component into the other, and

(c) the possible hydrogen bond interactions between unlike molecules.

Ultrasonic Velocity Study of Binary Liquid Mixtures of Ethylene Glycol (EG) With Different Amines at 308.15kψ

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Abstract : The Ultrasonic velocity studies on intermolecular interactions of binary liquid mixtures of Ethylene Glycols (EG) + n-butylamine (NBA), + sec-butylamine (SBA) + tert-butylamine (TBA), + n-hexylamine (NHA), + n-octylamine (NOA) and + cyclohexylamine (CHA) have been measured at 308.15K. From the experimental results the excess molar volume (V^E), excess viscosities (η^E), and excess molar Gibbs free energy of activation of viscous flow (G^{*E}) have been computed as a function of composition. The parameter d^1 of the Grunberg and Nissan expression has been computed. The values of V^E are negative whereas the values of η^E, G^{*E} and d^1 are positive. Deviations from the ideal behavior are discussed from the point of view of the molecular interactions present between the unlike molecules. The strength of these interactions is related with the chain length of the amines. The results are discussed in terms of the theories of non-electrolyte solutions.

IndexTerms - viscous flow , binary liquid mixtures , molar Gibbs.

I. INTRODUCTION

Ultrasonic technique is a versatile tool for investigating the physical properties of matter-solids, liquids and gases. Ultrasonic velocity measurements have proved that they are useful in dealing with the problems of liquid structure and molecular interactions in liquid mixtures. This method has been applied both to pure liquids and to electrolyte solutions. For four and a half decade, extensively ultrasonic velocity measurements have been carried out for a large number of liquid mixtures. Ultrasonic propagation parameters yield valuable information regarding behaviour of binary liquid systems because intramolecular and intermolecular association, dipolar interactions, complex formation and related structural changes affect the compressibility of the system which in turn produces corresponding variations in the ultrasonic velocity.

It may be mentioned here that the sound velocity is not a primary thermodynamic parameter and there is no single agreed view regarding the method of evaluation of sound velocity in an ideal mixture. Even though the sound velocity in an ideal mixture can be expressed as an additive on the mole fraction basis[1,2] or weight fraction basis[3], the excess sound velocity so obtained does not properly characterize the deviations of the acoustic properties of the mixture from ideality. However, the attempts made by Ernst and Glinski[4] and Kiyohara et al.[5,6] indicate that sound velocities evaluated making use of thermodynamically valid expressions may be utilized to obtain excess sound velocities which are useful in understanding the solute-solvent interactions. It is worthwhile to note here that Kudriavtsev[7] derived expressions for evaluating theoretically the velocity of sound in pure liquids and liquid mixtures based on thermodynamically valid equations for internal energy in liquids and liquid mixtures and found that the expressions yield velocity data in good agreement with the experimental data for binary mixtures.

In many industrial applications, liquid mixtures are mostly used in processing and product formulations rather than single component liquid systems. Thermodynamic and transport properties[8-10] of liquid mixtures have been extensively used to study the deviation of real liquid mixtures from ideality. In addition, these properties have been widely used to study the intermolecular interactions between the various species present in the liquid mixtures[8-10]. Ultrasonic velocity and related data of liquid mixtures are also found to be the most powerful tool in testing the theories of liquid state. In addition, ultrasonic velocity data can be utilized to deduce some useful properties of liquid mixtures which are not easily accessible by other means.

The high precision of ultrasonic velocity measurements make it possible to calculate many other reliable parameters which gives information regarding deviations of the system from ideality. Molecular association in solution and some important correlations with various parameters, e.g. ratio of heat capacities, isentropic compressibilities, free volume, intermolecular free-length, available volume, internal pressure, energy of vaporisation, solubility parameter, non-linearity parameter, thermoacoustical parameters etc. can be very well studied through ultrasonic velocity measurements in liquid mixtures.

It has been pointed out by several workers that excess thermodynamic functions sensitively depend not only on the differences in intermolecular forces, but also on the differences in size of molecules. It is

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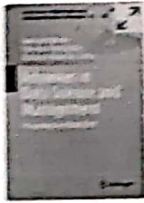
Advances in Data Science and Management pp 209–214

Expectation of Radar Returns from Ionosphere Using Decision Tree Technique

G. Ameer Basha, K. Lakshmana Gupta & K. Ramakrishna ✉

Abstract

In this paper, the prediction of Decision Tree classification is assessed using two property attribute selection choice measures for the ionosphere dataset. Decision Tree utilizes isolate and vanquish system for the essential learning procedure. From the outcome investigation, we can reason that the execution of Decision Tree classification depends on the characteristic attribute selection choice measures. Decision Tree is valuable since development of choice tree classifiers does not require any area learning. The primary goal is to manufacture a proficient expectation demonstrate for ionosphere radar comes back with high exactness.

Keywords

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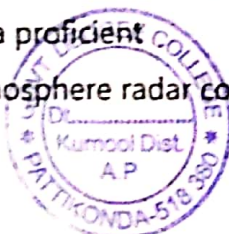
Methods for the Synthesis of Piperazine Derivatives Containing a Chiral Bi-2-naphthyl Moiety

Mariappan Periasamy* , Boda Venkanna , Miriyala Nagaraju , Lakavathu Mohan

› Author Affiliations

Further Information

Abstract	Full Text (/products/ejournals/html/10.1055/s-0037-1610731)	References	Supplementary Material
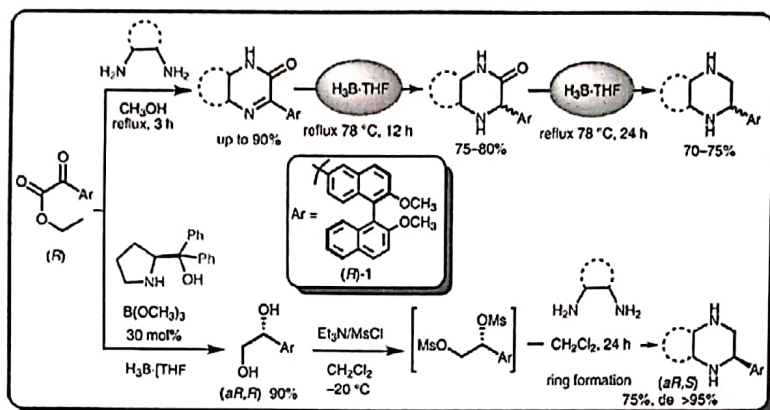
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Abstract

Piperazine derivatives containing 1,1′-bi-2-naphthyl moiety were synthesized starting from 2,2′-dimethoxy-1,1′-binaphthalene via acylation using ethyl chlorooxoacetate and subsequent condensation with 1,2-diamines followed by reduction of the corresponding dihydro-2-piperazinone intermediate using the $NaBH_4/I_2$ reagent system. The corresponding chiral piperazine derivatives containing bi-2-napthyl moiety was synthesized by asymmetric reduction of ethyl dimethoxy-bi-2-naphthyloxoacetate by chiral oxazoborolidine catalyst prepared in situ using S-diphenylprolinol (S-DPP), $B(OCH_3)_3$ and $H_3B·THF$. The resulting diols were mesylated and cyclized using 1,2-diamines to obtain the corresponding chiral piperazine derivatives.

Key words

piperazine - 1,2-diamines - bi-2-naphthyl - ethyl chlorooxoacetate

Supporting Information

Supporting information for this article is available online at https://doi.org/10.1055/s-0037-161073   Manage Preferences

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Segregation and Aggregation Network for Cloud Segmentation-Atmospheric Science

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Abstract—Segmenting cloud from intensity images is an essential research topic at the intersection of atmospheric science and computer vision, which plays a vital role in weather forecasts, environmental monitoring, and climate evolution analysis. The ground-based sky/cloud image segmentation can help to extract the cloud from the original image and analyze the shape or additional features. The early approaches are mainly based on traditional methods and have limited segmentation performance on both day and night instances. After the advent of deep learning, many researches have been conducted to adopt con- volutional neural networks (CNNs) to perform the end-to-end training of a segmentation model. However, these early CNN- based designs usually use a great number of parameters to guarantee accuracy, leading to a slow inference speed. In this paper, we introduced a novel sky/cloud segmentation network named Bilateral Segregation and Aggregation Network (BSANet)with 16.37 MBytes, which can reduce 70.68% of model size

and achieve almost the same performance as the state-of-the- art method. After the deployment via TensorRT, BSANet-large configuration can achieve 392 fps in FP16, while BSANet-lite can achieve 1390 fps. Additionally, we proposed a novel and fast pre-training strategy for sky/cloud segmentation which can improve the accuracy of segmentation when ImageNet pre-training is not available. In the spirit of reproducible research, the model code, dataset, and results of the experiments in this paper are available at: https://github.com/Att100/BSANet-cloudseg.

Index Terms—cloud segmentation, deep learning, pre-training, bilateral segregation and aggregation module (BSAM)

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I. INTRODUCTION

CLOUD/SKY relationship and distribution understanding have profound significance for the atmospheric science area. With the rise of computer vision and machine learning technology, it has been devoted to being applied in several interdisciplinary areas related to meteorology estimation and weather prediction [1]–[4]. This information can provide us with not only the status of the cloud but also ample low-level features. To retrieve this information, a common approach is to analyze the picture captured by a meteorological satellite in near-earth orbit, but this method is often expensive and

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Title

A Review on the Current Status of Atmospheric Science on Clouds and Numerical Weather Prediction in Surface

Authors

R. Madhuri
Suneetha R

Abstract

: Earth system modelling is currently playing an increasing role in weather forecasting and understanding climate change, however, the operation, deployment and development of numerical Earth system models are extremely demanding in terms of computational resources and human effort. Merging synergies has become a natural process by which national meteorological services assess and contribute to the development of such systems. With the advent of joining synergies at the national level, the second edition of the workshop on Numerical Weather Prediction in Portugal was promoted by the Portuguese Institute for the Sea and Atmosphere, I.P. (IPMA), in cooperation with several Portuguese Universities. The event was hosted by the University of Évora, during the period of 11–12 of November 2021. It was dedicated to surface–atmosphere interactions and allowed the exchange of experiences between experts, students and newcomers. The workshop provided a refreshed overview of ongoing research and development topics in Portugal on surface–atmosphere interaction modelling and its applications and an opportunity to revisit some of the concepts associated with this area of atmospheric sciences. This article reports on the main aspects discussed and offers guidance on the many technical and scientific modelling platforms currently under study.

Key Words

: Earth system modelling; Earth observations; numerical weather prediction; land modelling; surface–atmosphere interactions; global circulation models; global climate models; limited area models; regional climate models; surface models; ensemble; data assimilation; reanalyses; artificial intelligence; land cover; land use; wildfires

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Internalization and induction of defense responses in tobacco by harpin$_{Pss}$ conjugated gold nanoparticles as a foliar spray

Sippi Issac Kongala [a][c] 👤 ✉ , Sandhya Rani Nadendla [a], Praveen Mamidala [a][b]

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Abstract

Controlled and targeted delivery of elicitor molecules with improved bioavailability is required to treat plant diseases. Here we reported stable, reproducible, and nano-sized (20–22 nm) negatively (H-AuNPs) and positively (H-CAuNPs) charged harpin adsorbed nanoparticles to induce defense responses in tobacco. The foliar application of NPs facilitated their entry possibly through epidermal stomata accumulated in the apoplast and symplast eliciting the hypersensitive response (HR) with the up-regulation of pathogenesis-related gene transcripts (PR-1, PR-2, PR-3, chitinase, HSR203, and HR specific marker gene 'HIN1') in 6 h. Immunogold labeling of harpin$_{Pss}$ revealed its internalization (symplast & apoplast) and correlated with the induction of defense responses. Studies with fluorescently labeled NPs demonstrated the uptake and distribution within the leaf. Transmission electron microscopy observations revealed the internalization of H-CAuNPs and long-distance transport, eliciting systemic acquired resistance. Our observation holds promise in effectively minimizing the concentration of harpin for field application.
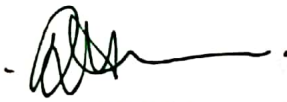
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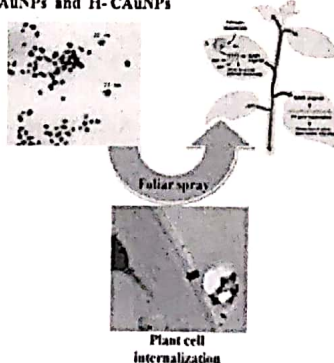
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Introduction

A Case Study on thermodynamic properties of binary mixtures of diethyl carbonate with benzonitrile, benzaldehyde at different temperatures

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ABSTRACT

The speed of sound and density in binary liquid mixture of diethyl carbonate + benzonitrile, + benzaldehyde have been determined at temperatures 298.15, 308.15 and 318.15 K over the whole composition range. The data have been utilized to estimate the excess adiabatic compressibility (β^E), excess intermolecular free length (L^E), excess speed of sound (u^E) at the above temperatures. The excess values have been found to be useful in estimating the strength of the interactions in the liquid mixtures.

Keywords: Binary mixtures; Excess adiabatic compressibility; Excess free length; Excess speed of sound

1.INTRODUCTION : Due to their unusual behavior, binary liquid mixtures have attracted considerable attention in different fields. In chemical process industries, materials are normally handled in fluid form and as a consequence, the physical, chemical, and transport properties of fluids assume importance [1–4]. Thus data on some of the properties associated with the liquids and liquid mixtures like speed of sound, density, excess adiabatic compressibility, excess free length and excess speed of sound find extensive applications in chemical industry and engineering design [5,6]. Diethyl carbonate (DEC) is a solvent of both extraction and reaction used in many industries such as agrochemicals, pharmaceuticals and hydrocarbon refinery. It can make dyeing uniformity and increase fading against sunshine. DEC was also proposed as lubricant of the new refrigerant, hydro fluorocarbon and as paint remover in the paint industry. Benzonitrile and benzaldehyde are important liquids which find variety of applications such as solvent for lacquers, oils and resins. Several researchers [7,8] studied the molecular interactions in binary liquid mixtures containing diethyl carbonate by measuring the values of density and speed of sound. As a part of the experimental investigation of the excess thermodynamic properties of industrially important liquids like diethyl carbonate, here we report the densities, speeds of sound, excess adiabatic compressibility (βE), excess intermolecular free length ($Lf E$) and excess speed of sound (uE) for binary mixtures of the above mentioned systems at temperatures (198.15, 208.15 and 218.15) K over the entire composition range.

2.MATERIALS AND METHODS : All the chemicals used in this study were purchased from Sigma Aldrich Chemicals Company. According to the manufacturer, the purities of these compounds were >99 %. The purity of the samples was checked by comparing the observed values of densities, speeds of sound and refractive indices with those reported in literature and were used as such without further purification. Anton Paar DSA 5000 density and sound analyzer provided with two Pt 100 platinum thermometer was used for measuring the densities and speeds of sound of pure liquids and liquid mixtures. The density is extremely sensitive to temperature, so the apparatus was controlled to ±0.001 K by a built-in solid state thermostat. The stated

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One-pot synthesis of novel substituted quinoxaline piperazine derivatives and their antimicrobial activities

Y. Narasimha Reddy [a], Radhakrishna Reddy Mardi [b], Nagaraja Reddy G [a], Sreenivasulu Reddy T [a], Kondaiah Seku [c] ✉, Heba Mohamed Fahmy [d] ✉, Shams H. Abdel-Hafez [e], Mahmoud M. Hessien [e], Ahmed Esmail Shalan [f g] ✉
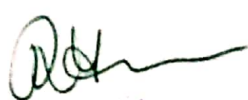
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Abstract

The present investigation reports the preparation of 1-(4-(tolyl quinoxaline-2-yl) piperazine-1-yl) derivatives catalyzed via polymer supported reagents. We have developed novel quinoxaline piperazine derivatives from 2,3-dichloroquinoxaline, wherein one chloro group is substituted with an aryl group, and the other is substituted by alkyl and aryl piperazine derivatives, through aromatic nucleophilic substitution reaction, and Suzuki coupling reactions to substituted quinoxaline-piperazine derivatives (5a-5g) compounds. The synthesized compounds were identified using FTIR, ^{1}H NMR, ^{13}C NMR and LC-MS. The synthesized compounds were examined for their antimicrobial activity. The results indicated that 5d, 5f and 5g compounds have exhibited well to moderate antibacterial activity with the zone of inhibition of 18, 22 and 21 mm for *Escherichia coli* (40µg/mL), and 17, 19 and 17 mm for *Staphylococcus aureus* (40µg/mL). Besides, 5f compound showed respectable results to moderate antifungal activity with the zone of inhibition of 21 mm for *Aspergillus niger* (40µg/mL) and 19 mm for *Candida albicans* (40µg/mL). The established synthetic route is beneficial to develop various key intermediates as well as active pharmaceutical ingredients for pharmaceutical applications.

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Heat and mass transfer on unsteady MHD convective flow through porous medium between two vertical plates with chemical reaction

S. Abhilash Anand Kumar, S Sreedhar, M Veera Krishna

Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering

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Abstract

The present investigation explores the unsteady magnetohydrodynamic (MHD) free convective oscillating flow of an optically thin incompressible viscous fluid embedded in two parallel porous walls under the influence of an externally applied transverse ...

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Impact of the Atmospheric Science on Clouds Destination and Weather Conditions

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Abstract: Climate and weather conditions at a destination influence the decision regarding what season and which location tourists might travel to. Assuming that the holiday experiences and satisfaction during their stay are influenced by weather and climate as well, this study investigates the question: does bad weather lead to a higher complaint rate among guests who booked vacation rentals? To answer this question, the complaint behavior and the weather parameters temperature precipitation, wind speed and humidity are examined. The correlations between weather and complaining behavior are proven using the four-field coefficient. The chi-square four-field test is used to subsequently test independence. As a result, a correlation between the weather parameters and complaints cannot be proven based on the applied methods and used data. The four-field coefficient cannot confirm a correlation, as it is close to zero for all four weather parameters. For further investigations, more complaint data are required to obtain more significant results.

Keywords: weather; climate; holiday destination; leisure tourism; vacation rentals; complaint rate; beach holiday

1. Introduction

Leisure tourism is highly dependent on local climatic conditions, especially in the case of beach or activity holidays [1–5]. The weather is decisive for 43% of tourists after the influencing factors of landscape and price when choosing a holiday destination [6]. Tourists choose destinations because of their climate, both for summer holidays [7,8] and for winter holidays [9,10]. With regard to weather and climate, factors such as the intensity, frequency or spatial distribution of meteorological parameters play a decisive role. Exemplary meteorological factors are precipitation, wind speed, air temperature, air humidity and air pressure. In addition, prevailing conditions play a decisive role as well [11]. Weather can enhance the holiday as well as the experience of holiday activities [12]. On the other hand, it can prevent a nice holiday or a positive holiday experience [13]. Even in retrospect, holiday weather influences the memories of tourists far beyond the day of departure [14,15]. From the perspective of tourists, weather is good or bad, depending on the impact of weather on the holiday experience and the expectations of the tourists [16,17]. The expectations of tourists regarding the weather at their holiday destination are shaped by destinations, tour operators and the media, for example, through catalogues, advertising and images [18,19]. The vast majority of tourists—according to studies, 70% [20] to 90% [17])—inform themselves about the holiday weather before traveling. Tourists have a sufficiently concrete idea of the parameters temperature, precipitation or sunshine duration they can expect during their stay at a specific destination [3,6]. These weather data are long-term averages over a period of 30 years (climate data). However, they offer no guarantee of how the short-term weather conditions will actually turn out during the holiday [21]. Therefore, tourists cannot rely on these data and must expect worse weather during the holiday, which can reduce holiday enjoyment [17]. However, bad weather is not a legitimate reason for a complaint. The tour operator is not responsible for the weather and catalogue information on the climate is not part of the contract (LG Hannover, judgement of 17 August 2009, 1 0 209/07). Weather is, therefore, a natural risk that every tourist must bear. Bad weather, thus, has the potential to spoil a trip [15,22,23], but tourists cannot protect themselves against this risk.

Nevertheless, the question arises as to whether tourists try to obtain financial compen- sation for bad weather from the tour operator. A course of action might be complaining about defects that tourists would not otherwise complain about, or defects that are difficult to verify afterwards, such as lack of cleanliness or bad smells of their accommodation. Us-ing the example of tourists booking vacation rentals in Western Europe, this study focuses on the question: will more frequent complaints be devised by tourists if bad weather occurs during the stay?

VOL.: 2 ISSUE.: 1(2023)

Role of GMCG Sector in India-with Special Reference to Hyderabad City

Author(s): T Gangadhar

Abstract:

A final good or consumer good is a final product ready for sale that is used by the consumer to satisfy current wants or needs, unlike a intermediate goods, which is used to produce other goods. A microwave oven or a bicycle is a final good, but the parts purchased to manufacture them are intermediate goods The Fast Moving Consumer Goods (FMCG) sector is the key contributor of the Indian economy. This fourth largest sector of Indian economy provides employment to around 3 million people which accounts for approximately 5% of the total factory employment in the country. These products are daily consumed by each and every strata of the society irrespective of social class, income group, age group etc. FMCG sector is more lucrative because of low penetration levels, well established distribution network, low operating cost, lower per capita consumption, large consumer base and simple manufacturing processes for most of products resulting in fairly low capital investments.

Keywords: FMCG products, marketing strategies, overview & growth

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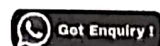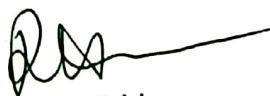
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