NOTES

EUROPEAN WORKSHOP ON FABRIC QUANTIFICATION

A fabric is mainly defined by the spatial arrangement or pattern of matter on different scales. Amongst several examples in nature, the fabric can be defined by (a) shape and spatial distribution of material domains or pores in a rock (b) the crystallographic preferred orientation of mineral grains (c) the pattern of grain boundary or fracture systems etc. Natural geological or artificial processes can modify a pattern (fabric). As a result, quantification of the pattern can provide insight into the pattern forming processes. Thus, a *"European Workshop on Fabric Quantification"* was conducted from 9-13th October 2006 in the Tectonics and Material Fabrics Section, Technische Universität München (Germany). Professor Dr. Jörn H. Kruhl, Mark Peternell and Axel Gerik were the organizers. A total of 11 geoscientists from Italy, Czech Republic, Poland, Germany, Canada and India participated in the workshop. The author was the participant from India.

During the workshop the importance of *"fractal geometry"* in quantifying fabric and using fractals as a tool for inferring pattern-forming processes was highlighted. Thus, the workshop started with an introduction to basic concepts of fractal geometry and non-linear processes. This was followed by a presentation of different techniques that can be used to analyse fractals such as box-counting, Cantor-dust, perimeter method etc. The participants were divided into three groups for some of the practial exercises such as measurement of the coastline of Great Britain using the perimeter method, analysis of fractal patterns from experiments using box-counting method and generation of Sierpinski Triangle that required manual measurement of fractal dimension. The participants were also trained in automated methods of calculating fractals using the above

methods with the help of computer programme *"Benoit"*.

The organizers of the workshop have tremendous experience in the application of fractals in geosciences and have contributed to the advancement of this field. They have developed new techniques and programmes for anisotropy analysis. Therefore the participants were introduced to these new methods such as (a) modified Cantor-dust method for quantification of anisotropies of fracture networks, (b) the map-counting method for quantification of pattern inhomogeneties and (c) a combined Cantor-dust and perimeter method for the quantification of grain boundary patterns. Further, case histories were presented to highlight the application of fractal shapes of sutured quartz grain boundaries as geothermometers. The participants were encouraged to analyse their own samples using the different methods that were introduced during the workshop. In this regard, the author presented a lecture entitled *"Fabric quantification in the Godhra Granite, Aravalli Mountain Belt (India)"*.

The workshop ended with a discussion about the various possible applications of fabric quantification in analysis of pattern-forming processes, volcanic materials, porosity and rheology. Further, the need for better automated programmes for applying fractal analysis in geosciences was highlighted. The organizers plan to hold another workshop in the year 2007.

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SIPE'S FIFTH ASIA PACIFIC REMOTE SENSING SYMPOSIUM IN GOA

The fifth Asia-Pacific Remote Sensing Symposium of the International Society of Optical Engineering (SPIE) was held in Goa from 13-17 November 2006. His Excellency Shri S.C. Jamir, the Governor of Goa, inaugurated the symposium by lighting the ceremonial lamp at the Cardium auditorium of the National Institute of Oceanography at Dona Paula, Goa. This meeting which is held in alternate

years in the Asia-Pacific region, was attended by foreign scientists from sponsoring government agencies of USA and Japan, and scientists from various Indian institutions to explore remote sensing for resource management and disaster warning and mitigation. The event was co-sponsored by Indian agencies such as ISRO, NIO, DST, MoES, etc.

The themes of the symposium were: (1) Remote sensing

and modeling of the atmosphere, oceans and interactions. (2) Multi-, hyper- and ultra-spectral remote sensing technology, techniques and applications, (3) Remote sensing of the marine environment, (4) GEOSS and next generation sensors and missions, (5) Remote sensing of the atmosphere and clouds, (6) Lidar remote sensing for environmental monitoring, (7) Microwave remote sensing of the atmosphere and environment, (8) Agriculture and hydrology applications of remote sensing and (9) Disaster forewarning, diagnostic methods and management.

After the inaugural function on 13th November, five parallel plenary sessions were held on the above main themes (1), (2), (4), (5) and (6) which saw a galaxy of experts attending to the audo-visual presentations made under sub-themes: Satellite data assimilation and numerical modeling; Atmospheric Infrared Sounder; Product retrieval, validation and application; Atmospheric effect and correction, inverse modeling and new sensors; Clouds and aerosols; Application of SAR data to resource and disaster management, and crop management and forecasting-1. 14th and 15th November saw continuation of presentations on the above sub-themes and on some new themes such as radiative transfer modeling and geophysical parameter retrieval. Presentations were made on topics ranging from "GIS and expert system diagnostic tools for disease and pest management in pearl millet crop" by ISRO scientists to "Monitoring fire and smoke emissions with the hazard mapping system" by NIAA experts.

Apart from oral presentations on sub-themes like land surface classification and applications, coastal ecosystems and phenomena – Monitoring of the coastal zone,

poster sessions were held on 16th November comprising of 200 posters, of which 90 were from Indian research organizations, on various topics ranging from "Characteristics of tsunami inundation area in the eastern part of Sri Lanka due to the 2004 Sumatra earthquake observed in high resolution satellite images" by Japanese scientists to "A new remote sensing model for retrieving snow depth within 30 centimeter using MODIS data" by Chinese researchers. On the final day of the event oral sessions were held which were devoted to open ocean processes, circulation and carbon cycle, flood risk assessment and prediction and snow and ice. Researchers from remote sensing section of NCAOR also gave presentations.

The symposium has opened new avenue and challenges in designing of next-generation sensors for disaster forewarning and management, agriculture and hydrological applications, microwave and lidar remote sensing for environmental monitoring etc. The fact that about a one third of the total presentations and posters were from Indian researchers shows that the country is catching up with the Japanese, Chinese and US counterparts in optical engineering and modeling studies using remote sensing data. This brought together policy makers, scientists, and engineers from world over for exchange of ideas and sharing of current knowledge of recent developments as well as expected societal benefits and socio-economic payoffs.

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GROUNDWATER SIMULATION STUDIES – WITH A CASE STUDY OF WESTERN YAMUNA CANAL COMMAND, HARYANA

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EXTENDED ABSTRACT

Introduction

The hydrogeologists of the modern world are required to predict about the expected groundwater levels in 2020 or to predict what will be the impact on the phreatic aquifer if some desired quantum of water is to be pumped out of the deeper, believed to be confined aquifer or the most likely pathway of the contaminants which have been detected in groundwater, to find an economically viable solution. The answers to these questions involve a correct conceptual model, selection of appropriate parameter values to describe