

## In this issue

### Methane releases from Blake Ridge gas hydrates

There is an increased interest to explore gas hydrate reservoirs in different ocean basins in view of their importance as future energy resource and a driver for global climate change. For India, the gas hydrate reserves will be important to meet her requirement of energy for a growing population and improvement in the quality of life. There are two views explaining the methane releases from destabilization of gas hydrates, which are deposited under very high pressure and low temperature at depths >500 m in the marine realms. The dissociation of gas hydrate has been linked to: (1) an increase in bottom water temperature, and (2) reduction of hydrostatic pressure of the overlying water column due to sea level changes.

Blake Ridge in the northwest Atlantic Ocean is a proven gas hydrate field, which is ideal for gas hydrate study. Bhaumik and Gupta (page 192) analysed deep-sea benthic foraminifera and total organic carbon from gas hydrated sediments of Ocean Drilling Program Hole 997A, Leg 164, Blake Ridge over the past 5.4 Ma. The higher population of seep-related benthic foraminifera and low organic carbon in the sediments at times of lowered sea level indicate dissociation of gas hydrate and release of methane. The intensity of methane releases increased with the advent of Northern Hemisphere glaciation since 3.2 Ma. Certain species of benthic foraminifera have proved to be an important biomarker for gas hydrate accumulations and methane releases.

### Exploring the continental aerosols

Aerosols are suspended particulates in the atmosphere and have implications to climate through different mechanisms. Aerosol impact on climate is still unknown due to lack of adequate database. It is imperative that simultaneous measurements of aerosols and clouds from space are performed carefully to answer crucial questions related to climate change. Satellite remote sensing is best suited for obtaining information on aerosols on either a regional or a global basis even though their intelligent retrieval is very important for these measurements to be accu-

rate. While remote sensing of aerosols over ocean is simpler, retrieval of aerosol properties over continental regions is complicated due to irregular terrain characteristics and high surface reflection. The aerosol retrieval of algorithms used in present satellite sensors are not free from the high reflectance effect of land and hence lead to large uncertainties in the retrieved parameters. S. K. Satheesh and K. Krishna Moorthy (page 174) propose a dedicated satellite sensor namely multi-angle polarization imager (MAPI) for intelligent and accurate retrieval of aerosol over continental regions. The proposed sensor (MAPI) has been designed utilizing a combination of features used in earlier satellites such as MODIS, MISR and POLDER. The proposed sensor has the ability to measure multi-spectral, multi-angle and polarized components of reflected radiation from the Earth, which enable to suppress the undesirable surface reflectance effect and hence efficient aerosol retrieval over continental regions. The proposed sensor, by utilizing a wide range of wavelengths from visible to far infrared, has the ability to distinguish dust aerosols (which is the major natural aerosol component over land) from other aerosol species. This is the first step towards separating natural and anthropogenic aerosols, which is essential to answer crucial questions related to climate change needed for the scientific community at large.

### Tailored size sodium hyaluronate for osteoarthritis

Osteoarthritis is characterized by a loss of articular cartilage. Visco-supplementation can be achieved by injecting sodium hyaluronate (HA) into the affected joint. HA is a linear polysaccharide consisting of repeating disaccharide units of D-glucuronic acid and N-acetyl D-glucosamine. The average molecular weight of HA derived from rooster combs ranges between 1.7–2 million Daltons. The material used as such in the form of about 1% solution or the modified (chemically cross-linked) material of increased molecular weight gives rise to certain adverse reactions. It was the aim of Mehta *et al.* (page 209) to reduce the size of natural HA to assess if the adverse reaction

could be overcome. They present a process of preparation of HA of tailored molecular size with desired physico-chemical characteristics from the natural material obtained by extracting it from rooster combs. The physico-chemical properties of the bulk HA and its various tailored fractions were studied. The bulk HA was hydrolysed by steam under pressure, with variations in the process parameters, to attain the desired molecular size. The size-reduced HA in the form of 1% solution in phosphate buffer had excellent rejuvenating effects in osteoarthritis. More than 1500 patients suffering from osteoarthritis of the knee have been treated with satisfactory results.

### Characterization of variability

*Fusarium* head blight of wheat has been associated with up to 17 causal organisms, of which *Fusarium graminearum* is the principal pathogen responsible for head blight in many countries including India. Under the new WTO regime, wheat quality will be of paramount importance as this disease may hinder exports as *Fusarium* spp. are known to produce mycotoxins in grains. For applying efficient strategies in the breeding process, knowledge about the genetic diversity and structure of naturally occurring pathogen populations are indispensable. In some host–pathogen systems including *Fusarium* head blight of wheat, differential hosts are not available. In such cases, molecular markers can be used for studying genetic variability in plant pathogens.

Saharan *et al.* (page 230), describe the use of Randomly Amplified Polymorphic DNA (RAPD) for studying genetic variation among *F. graminearum* isolates. Oligonucleotide primers were used for performing RAPD. DICE coefficients were used to generate dendrogram using the SAHN clustering program, selecting the unweighted pair-group method with arithmetic average (UPGMA) algorithm in NTSYS-pc. The dendrogram obtained from cluster analysis of the DNA fingerprints revealed a great deal of heterogeneity among the isolates as forming 4 clusters. Genetic variation detected at DNA level indicate a great ability of pathogen to adapt to different life cycle conditions.