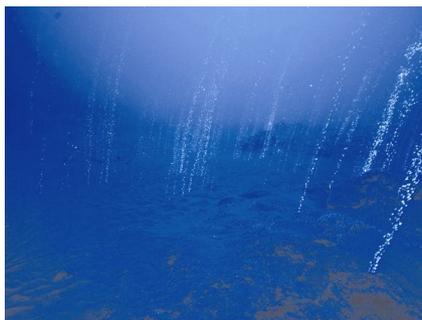


## In this issue

### Culturable bacterial diversity from a shallow vent of Azores

The Azores is an archipelago of nine islands situated in the North Atlantic. Faial and Pico are two islands located in the central group, estimated to have emerged during the Pleistocene.



Low temperature hydrothermal field has been discovered in the Faial–Pico channel off the Espalamaca headland that extends for a few tens of meters at approximately 35 m depth. The area has been surveyed, during summer 2010. Bacterial diversity using 16S rRNA gene associated with the domain bacteria was examined at the level of operational taxonomic units (OTU) using the rarefaction analysis (RFA) from the vent and nonvent site. A total of 318 bacterial colonies that appeared on various isolation media were selected for 16S rRNA gene sequencing analysis. Results indicated 95 OTUs from venting area and 39 OTUs from nonventing area which belong to 30 families and 6 phyla, Actinobacteria, Bacteroidetes, Firmicutes,  $\alpha$ -Proteobacteria,  $\beta$ -Proteobacteria and  $\gamma$ -Proteobacteria. Shannon index ( $H'$ ) and the Chao I richness estimator illustrated a strong bacterial community in the venting area. In general the bacterial genera which are normally reported from other shallow water vents were minimized but at the same time these vents were overloaded with many uncommon bacteria which may confer around 33 new taxa. See **page 58**.

### Nanocrystalline silica from termite mounds

Termites have considerable influence on the physical and chemical properties of tropical and sub-tropical soils. Through their routine activities, termites infuse substantial modifications to the soil on which the hill is built. The mounds are generally made up of sand grains and fine cellulose materials, which are coated with some sticky and hardening materials secreted by termites. Termite hill soils become hard and their strength grows with time and their refractory properties may find applications. Therefore, in order to understand the physical properties and microstructures of the termite hill soils, Ganguli *et al.* (**page 83**) have carried out studies on the soil samples collected from two locations: near Dehradun in Uttarakhand and near Hauz Khas in New Delhi. Nanocrystalline  $\alpha$ -quartz was present



in both the samples while nanocrystalline  $\beta$ -cristobalite was present as a minor component only in the sample collected near Hauz Khas. In addition to silica, the soils were also rich in oxides of iron, magnesium, aluminium along with essential plant nutrients like potassium and calcium. This study shows that termite soils have nanocrystalline  $\alpha$ -quartz as the primary constituent but the dopant composition and morphology varies

at different sites and hence may be used for specific applications.

### ASTER-derived spectral maps for mapping limestone

Guha *et al.* (**page 40**) demonstrate how advanced multispectral satellite data like ASTER (Advanced Space Borne Thermal Emission and Reflection Radiometer) can be used for mapping limestone exposed under tropical weathering set up of India using spectral feature. Limestone has diagnostic absorption feature around 2335 nanometer (approximately 2.33 micrometer). The diagnostic absorption feature of limestone has been upscaled to bandwidth of ASTER data and broad ASTER convolved absorption feature of limestone is effectively utilized in three different spectral mapping algorithms (i.e. relative band depth, spectral angle mapper and constrained energy minimization) for delineating limestone in ASTER data. In this regard, the authors have attempted to assimilate the results of different spectral mapping algorithms into a composite map for mapping Kolhan limestone in parts of Jharkhand. Each mapping algorithm creates its own spectral map. These spectral maps are derived independently using different mapping algorithms although they have similarity with each other; these maps are also different at places in terms of spatial disposition of limestone in these maps. The results of these spectral maps have been integrated to derive a composite map of limestone using minimum noise fraction method; which is generally used in reducing the dimensionality of hyperspectral data. The composite map of limestone is further validated using ancillary geological database and spectral database (i.e. based on the comparison of the image spectra of pixel delineated as limestone with the ASTER convolved laboratory spectra of limestone exposure).