In this issue

Our dynamic Sun

Many mysteries about our sun had remained so because we could gather only distorted incomplete pictures of the object; availability of new instruments on the spacecraft SOHO has started the process of unravelling some of these enigmas. Earlier the plasma envelope surrounding the sun was guessed to be moulded by magnetic field structures; more precise measurements now have started suggesting new physical processes about the creation and growth of these ubiquitous features not only on the sun but elsewhere in the universe. Strong winds of matter from the sun have been closely studied and found to bring about other manifestations in outer space which affect interplanetary weather and many new human activities. A glimpse of such developments has been presented by Dwivedi on **page 1006.**

J. C. Bhattacharyya

Protein alterations

Crop plants are subject to a number of abiotic stresses that affect yield. Understanding the mechanisms by which plants respond and adapt to these stresses is a major thrust area for research in plant biology today, with considerable implications for improving crop productivity. Pareek *et al.* report in this issue (**page 1023**) a comprehensive study of the changes in protein profiles that occur in rice plants subjected to salinity, water stress, low and high temperatures. Described are proteins that are either specific to particular stresses or common to several or all of the stresses that have been examined. Some of these changes are also observed after exogenous application of abscisic acid, a plant hormone that is likely to be involved in plant response to certain abiotic stresses. Several proteins that are reported in this article have molecular weights and expression patterns that are similar to those described by other researchers either in rice or other plants. The challenge now is to understand the nature of these proteins and to establish their role in the stress response. This is likely to be a long-drawn process but the stakes are high; especially for a country like India where a substantial number of farmers practise agriculture under sub-optimal conditions in which these abiotic stresses are a harsh reality of life. A beginning can probably be made by cloning genes that encode some of these proteins and construction of transgenic plants that overexpress sense or anti-sense transcripts.

Ramesh V. Sonti

Seismicity in Koyna

An earthquake is a cataclysmic release of stresses that build up over a prolonged period of time at various rheological or brittle–ductile transitions in the crust. Of such transitions, trapped layers of aqueous fluids are known to have played a significant role in earthquake activity. In fact these have been cited as the most probable source of seismicity in the Koyna region. This is strongly corroborated by Sharma and Mall who systematically eliminate other possibilities in their paper (**page 1070**). Such fluids, under high pressure, are believed to bring about large-scale deformation either by seismic faulting under 'drained' conditions or by cataclastic flow under 'undrained' conditions.

Refined velocity modelling of Deep Seismic Sounding (DSS) data carried out earlier in the Koyna region led to the inference of a low velocity zone (LVZ) in the depth range of 6 to 11.5 km. This LVZ with a reduction of 0.2 km/s in the longitudinal velocity V_p could arise due to one or more factors such as high crustal temperatures, α/β transition of quartz, granitic intrusion and presence of fluids. A drop of 0.2 km/s in V_p can only be explained by an anomalously high geothermal gradient (40–70°C/km) and surface heat flow (100–200 m Wm^{-2}). The actual measured values are, however, much lower thus ruling out not only high crustal temperature but also the possibility of α/β transition of quartz which takes place around 573°C. Moreover, an analysis of the overall chemistry of thermal water largely suggests their meteoric origin besides reservoir temperatures of 95–135°C. This in turn precludes the possibility of granitic intrusion leaving us ultimately with almost the sole prospect of the presence of aqueous fluids to explain the lowering of velocity in the LVZ.

This conclusion is further reinforced by the authors with their laboratory study of seismic properties of dry and saturated granitic rocks, thermal and pore fluid pressures and pore fluid factor. Thus, the seismicity as well as the subsurface velocity structure in the Koyna region stand largely explained.

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