Editorial

New Guidelines to Authors:

As decided by IGU management some measures are being introduced to limit publication costs. Some details have been spelt out in July editorial. To avoid confusion and make the decision effective, "Guidelines for Authors" have been updated and included in the journal`s website. Details are also given in this issue`s soft and hard copies. The page charges for articles more than 10 pages in print would come in to force with effect from January, 2017. Authors are requested to take note of this.

When Rivers run low:

Environment protection rules are often flouted by project proponents in connivance with local authorities. Due to this, many projects end up in litigation. Such experiences, however, do not deter administrators and heads of states from competing with each other for investments and natural resources, which they think can make their states an attractive destination for investors. The competition has reached such proportions that state governments are now busy rolling out water projects without getting them appraised by central authorities. This, the Central Water Commission (CWC) has warned, is increasing the risk of inter-state wars over water, as is happening now between Andhra Pradesh and Telangana. Due to irregular monsoon activity, coupled with illegal resource pilfering from river beds none can assure normal river flows even during monsoon season. In the last two years, due to El Nino effect many rivers have gone dry. Recurrence of such a scenario is not ruled out.

When rivers run low, they threaten ecosystems, economies, and the communities who depend on them. Rivers, the lifeblood of society, face unprecedented threats from the world's changing climate. In particular, scientists expect that rivers in many regions will run lower than ever before and for longer spans of time. It is going to be very critical for us in future, as no one wants to tackle the problem by co-operating with each other in taking up mutually beneficial projects. In light of this, the study of low river flows, or low-stream flow hydrology, is critically important to society. A firm understanding of low-stream flow hydrology can help resource specialists manage, for example, municipal water supply, irrigation, industry allocations, river navigation, recreation, and wildlife conservation. Despite how low flow has direct ties to water scarcity and drought, relatively few studies evaluate how climate change will affect low flows. Low-flow studies have typically been grounded in the principle of stationarity—the idea that natural systems vary within a known, unchanging range of variability. But this assumption no longer holds. We urgently need a better understanding of the changing behaviour of low-flow conditions to inform sustainable water management and protect against potential risks and impacts. It is essential as such to give importance to low-stream flow hydrology to take up apt measures in maintaining existing irrigation projects and planning new projects.

Need for novel techniques to image crustal and sub crustal lithosphere structure

It is now well recognised by earth scientists that Indian shield is made up of discrete crustal blocks that were sutured together in geologic past. Significant studies have been carried out under Deep Continental studies program of DST, using both geophysical and geological techniques. 2-D structural models have been generated along select linear profiles using controlled source refraction and reflection studies. Models generated couple of decades ago have been refined using new processing algorithms. A close look into earlier and presently upgraded models indicates that the new models have added useful refinements to the 2-D models. These 2-D crustal models though resolved important issues pertaining to a specific geologic& tectonic terrain cannot be taken as THE models for entire span of geologic terrains like EDC, WDC, SGT, EGMB, NSL, DVP etc, basically because they are not 3-D in nature. Also they cannot be extended to crustal segments that are away from the linear profiles, making the results effectively applicable only to the area covered by linear profiles. When we were carrying out first D.S.S investigations along Kavali-Udipi profile we could not decisively decipher side reflections from a hidden structure present away from the profile, as noticed from data from SP.180. To resolve this we planned to have a small parallel profile, but could not do so as location and dimension specifics could not be resolved to fix up length and select effective recording geometry. When carrying out studies in SGT, data from Kuppam-Palani profile indicated presence of thick mid crustal LVL, which was supported by other geophysical studies and structural geologic investigations carried out by eminent geologists. As the profile was disjointed, shifted and contained gaps (basically due to logistic constraints, as we were using explosives as energy source) subjectivity crept in while unequivocally quantifying dimensions of this LVL, laterally and vertically. Even though we strongly believed in its presence, faced some embarrassment when international experts questioned the authenticity of LVL`s dimensions, especially when the data used was generated along shifted and disjointed profile. While feeling perturbed I and my learned colleagues could not do much to narrow down the subjectivity. To resolve many geologic problems, I am convinced, we should have 3-D structural models. Even though many may point out our country cannot afford such experiments that need large number of receivers (Arrays), I strongly advocate such studies to realistically resolve area specific scientifically important issues.

In support of my suggestion I give below a significant result obtained by US scientists, using USArray. I present some excerpts from these studies to impress upon the concerned the need to have similar studies in our country, by prioritising regions that are scientifically important, from disaster management and natural resource generation. While building up contiguous three dimensional crustal structure map of Indian sub continent, already available active and passive seismic models could be made use of as starting/reference models in better visualising lateral and vertical structural complexities.

USArray Results

"A new high-fidelity tomography harnesses USArray data to expose a wealth of noteworthy crustal and upper mantle structures, including previously unknown anomalies beneath the Appalachians.

A map of estimated crustal thickness, which is taken from the mean of the posterior distribution of models at a location has helped in clearly segregating, Cool toned thicker crust (up to 54 km), and warm toned thinner crust. For the past decade, USArray's large and dense grid of seismometers has gradually collected data on seismic waves across the contiguous United States. Using these data, seismologists generated a three-dimensional map of deep Earth structures. Such maps chart areas with different compositions or that are especially cold or hot in the Earth's underlying crust and upper mantle. As part of a series of studies striving to improve the methods used to produce these deep Earth maps, researchers have created a new type of three-dimensional model using a novel technique that jointly inverts data from earthquakes, ambient noise, and other sources collected beneath more than 1800 stations, then projected the results onto a map of the contiguous United States. The high resolution of the new model, which extends to a depth of 150 kilometers, highlights prominent structural differences beneath the eastern, central, and western United States, including the Cascadia Subduction Zone and the Snake River Plain in the Pacific Northwest and the Reelfoot Rift in the Southeast. The new model also reveals some previously unknown features that warrant further study, including three relatively low velocity areas in the upper mantle beneath the Appalachians—one centered beneath northern Georgia, a second below the Blue Ridge Mountains in western Virginia—and an especially prominent anomaly beneath New England's White and Green Mountains. Intriguingly, both the Virginia and New England anomalies are confined to the shallow mantle above 80 km depth and are areas that previous research has tentatively linked to a Cretaceous hot spot track.

The results of this study, including the new methodology, discussion of potential error sources associated with the model, and the improved resolution of these deep Earth maps, will be an important reference for other researchers interested in seismic tomography and the structure of the crust and upper mantle beneath the United States. (**Source**: *Journal of Geophysical Research: Solid Earth*, doi:10.1002/2016JB012887, 2016).

In This Issue:

This issue contains seven research articles, one "opinion" and one"Reminiscences" of a GSI scientist. This issue has 4 papers that are 10 pages in print. Due to co-operation from authors we could restrict the length of these papers, even though marginally. Hopefully, authors would co-operate even in future. All are requested to read new "guidelines to authors", in structuring their manuscripts.

We request you to extend needed support to JIGU by contributing articles that can strengthen our research base.

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