Borehole Geophysics Research Laboratory (BGRL) has been established by the Ministry of Earth Sciences (MoES), Government of India to address challenging seismological problems of societal relevance through scientific drilling investigations. BGRL was conceptualised as part of the Ministry’s flagship programme Scientific Deep Drilling in the Koyna Intraplate Seismic Zone, Maharashtra. Recognising the growing importance of scientific drilling and the lack of such facilities and expertise in the country, BGRL has undertaken to develop indigenous capacity and expertise in all aspects of scientific drilling, deep borehole geophysics, associated geological investigations and modelling dedicated to earthquake research on land.

BGRL started operating on October 7, 2014 from its temporary office in Karad with the help of a young team of dedicated scientific, technical and administrative staff. The project activities are being implemented utilising the administrative and financial support infrastructure of NCAOR, Goa.

The permanent infrastructure including office buildings, main laboratories and a state-of-the-art core repository is under development at its campus in Hazarmachi, Karad. Government of Maharashtra has provided 125 acres of land for the purpose.

The goal of BGRL is to emerge as an institution of international repute housing highly specialized geophysical, geological and geotechnical facilities related to earthquake research.

Scientific Deep Drilling in the Koyna Intraplate Seismic Zone, Maharashtra

BGRL (MoES) will carry out the unique project targeted to

- Reach the depths of earthquakes through scientific deep drilling and establish a fault zone observatory
- Sample fault zone materials for multi-disciplinary laboratory studies
- Model earthquake mechanism(s) using direct observations in the near-field before, during and after their occurrence

... ushering in a step advancement in seismological research
Background information

Reservoir triggered earthquakes have been occurring persistently in the Koyna region since the impoundment of the Shivaji Sagar Lake in 1962. A strong correlation between continued earthquake activity and the annual loading and unloading cycles of the Koyna and nearby Warna reservoirs has been established. However, a model to comprehend the genesis of reservoir triggered earthquakes is elusive, likely due to lack of observations from near-field.

Preparatory phase investigations

Prior to undertaking deep drilling, a preparatory phase of investigations was carried out by CSIR-NGRI to provide critical inputs to the location and design of the deep borehole observatory. Exploratory core drilling, at 9 sites up to 1522 m depth, airborne gravity gradiometry and magnetics, magnetotellurics, and airborne LIDAR provided constraints on subsurface geology and structure, subsurface temperature regime, and surface elevation pattern.

Ongoing activities at BGRL

1. Well design for 3km- and 5km- deep boreholes, site selection, planning
2. Scientific drilling of pilot boreholes in the Koyna seismic zone
3. Downhole geophysical logging, in-situ stress, VSP, geothermal and hydrological measurements
4. Establishment of state-of-art laboratories
5. Geological and geophysical studies on core samples
6. Capacity building in borehole instrumentation and long term monitoring

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