National Centre for Seismology

Ministry of Earth Sciences, Government of India

Unit 5

Background

- The history of instrumental earthquake monitoring in India dates back to 1898, when the first seismological observatory of the country was established at Alipore (Calcutta) on 1 December, 1898 after the great Shillong plateau earthquake of 1897.
- The occurrence of devastating earthquakes such as, the 1905 Kangra earthquake, 1934 Nepal-Bihar, Assam and many other strong earthquakes, necessitated to strengthen the national seismological network progressively from a paltry 6 in 1940 to 8 in 1950, 15 in 1960 and 18 in 1970.
- Early 1960s marked a very important land mark in the history of seismic monitoring, when the WWSSN(World Wide Standardized Seismic Network) stations started functioning globally.

Mission and Vision

- **Mission**

To work towards creating a seismic resilient society

- **Vision**

Understanding the earthquake source processes and their effects through earthquake monitoring and seismological research for the cause of earthquake-safe society

Introduction

- The National Center for Seismology (NCS) has been set up by bringing together all Seismology related activities of IMD (including those of EREC) under one umbrella.
- On creation of the NCS, all the ongoing activities and projects of IMD related to Seismology shall continue to be operated / implemented through the NCS.
- In addition, specific R&D activities will also be undertaken by NCS, using the data sets generated by various seismic and GPS networks.

National Centre for Seismology

- National Center for Seismology (NCS) is the nodal agency of the Government of India for monitoring of earthquake activity in the country. NCS maintains National Seismological Network of 115 stations each having state of art equipment and spreading all across the country.
- NCS monitors earthquake activity all across the country through its 24x7.
- NCS also monitors earthquake swarm and aftershock through deploying temporary observatory close to the affected region.

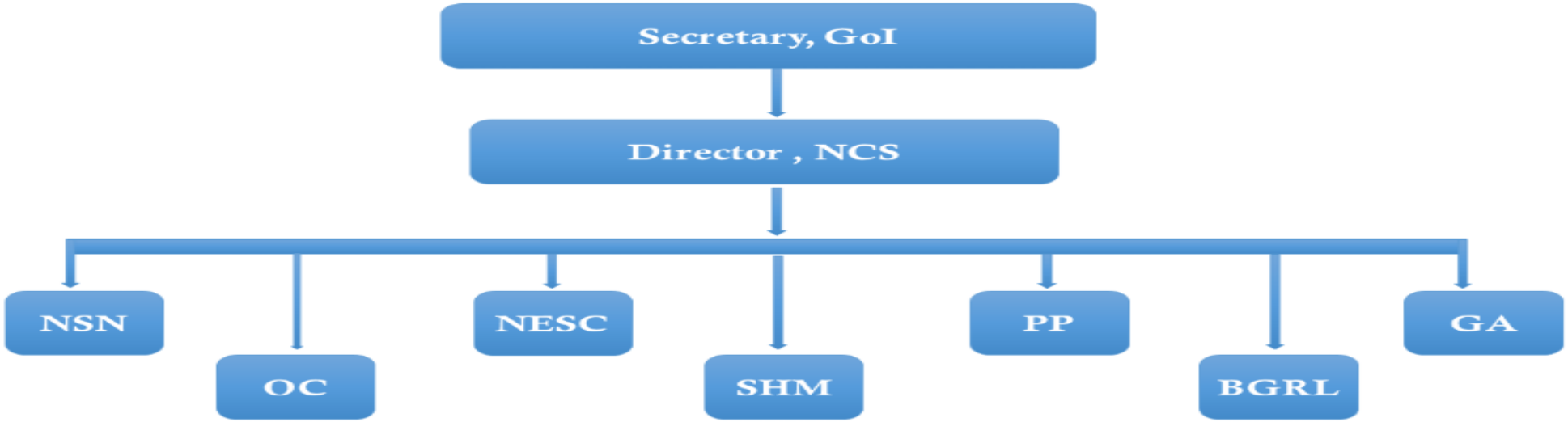
National Centre for Seismology

- Apart from earthquake monitoring, NCS is also actively involved in the Seismic Hazard Microzonation and seismological research. The major activities currently being pursued by the NCS are:
  - ✓ Earthquake monitoring on 24X7 basis
  - ✓ Operation and maintenance of national seismological network comprising of 115 Stations
  - ✓ Maintenance of Seismological data centre and information services.
  - ✓ Seismic hazard microzonation related studies
  - ✓ Aftershock/Earthquake swarm monitoring/survey
  - ✓ Understanding of Earthquake processes
  - ✓ Public outreach

Objectives

- Set up a new centre of excellence in Seismology, the ‘National Centre for Seismology’, at NOIDA, as a subordinate office, under the Ministry of Earth Sciences, by separating and bringing together all Seismology and earthquake hazard related activities of India Meteorological Department (IMD), under its ambit, for deriving the desired scientific developments in the field of earthquake science.

Organization Structure



NSN : National Seismological Network
OC : Operational Centre (24x7 round the clock monitoring)
SHM : Seismic Hazard Microzonation
PP : Program and Planning
GA : General Administration
NESC : North East Seismological Centre (erstwhile C S O) Shillong
BGRL : Borehole Geophysical Research Laboratory Karad

Services & Activities

- Earthquake monitoring on 24x7 basis through National Seismological Network (NSN) of 115 stations is the prime activity of the center. Dedicated team maintains NSN to make available the real time data for real time monitoring of earthquake activity all across the country.
- Central Seismological Observatory (CSO) Shillong established in 1902 as second observatory in India; maintains a 20 station network of northeast India a part of 115 station national network.
- Center also deploy temporary network as and when required for monitoring of swarm or aftershock activity nearest to affected region of the country.

Services & Activities - SHM

- Besides earthquake monitoring NCS is engaged in Seismic Hazard Microzonation (SHM) studies of populous urban centers.
- Seismic Hazard Microzonation' is a process of classifying a region into zones of relatively similar exposure to various earthquake-related effects and has emerged as a major tool towards our efforts for preparedness and mitigation of losses due to earthquakes.
- NCS has completed microzonation of Delhi region on 1:10,000 scale and played a key role in various studies relating to the seismic microzonation of other cities, such as, Jabalpur and Guwahati.
- Currently microzonation studies of Chennai, Koimbatore, Bhubaneshwar and Mangalore are in progress.

Services & Activities – Geological Activity

- Borehole Geophysics Research Laboratory (BGRL), Karad is engaged in scientific deep drilling in Koyna-Warna region for directly measuring the in-situ physical properties of rocks, pore-fluid pressure, hydrological parameters, temperature and other parameters of an intra-plate, active fault zone in the near-field of earthquakes – before, during and after their occurrence.

Services & Activities – Data dissimination

- NCS provides earthquake data and seismicity reports of specific regions to various user agencies such as, insurance companies, industrial units, power houses, river valley projects etc. on payment basis.
- Seismological data and earthquake related information is also provided to different agencies dealing with relief and rehabilitation measures, earthquake disaster mitigation and management related matters, seismic zoning, etc.
- As part of systematic archival of historical analog charts, state-of-the-art facilities have also been established for raster scanning and vector digitization of seismic analog charts.
- These facilities have enabled raster scanning of a lakh old analog charts and vector digitization of significant earthquake waveforms.

Services & Activities - Training

- In order to generate trained manpower in the field of seismology and allied subjects, NCS organizes training courses/ awareness programs in Seismology and allied subjects at various levels to station operators and scientists of departmental and various non-departmental agencies.
- Officers of center also deliver lectures on various Seismology related topics, on request, for the benefit of various state / central government organizations dealing with earthquake-related matters.
- Familiarization training on various operational activities related to earthquake monitoring is also imparted to trainees from various organizations.

Services & Activities - INSURANCE CLAIMS

- A “**certificate on earthquake occurrence”** is issued to the **concerned insurance company only** on payment basis for settling damage claims after seeking approval of competent authority of the department.

Services & Activities - Technical Reports

- Brief technical reports on Seismicity / earthquake data, in respect of different places / sites for setting up of various projects like hydroelectric, thermal power, Refineries, high rise buildings, railway bridges, community centers and other critical structures of importance, is supplied to the concerned authorities of central / state governments, public undertakings, multinational & private companies etc.
- Such reports / data are supplied on payment basis after seeking approval of competent authority of the department.

Archive Data

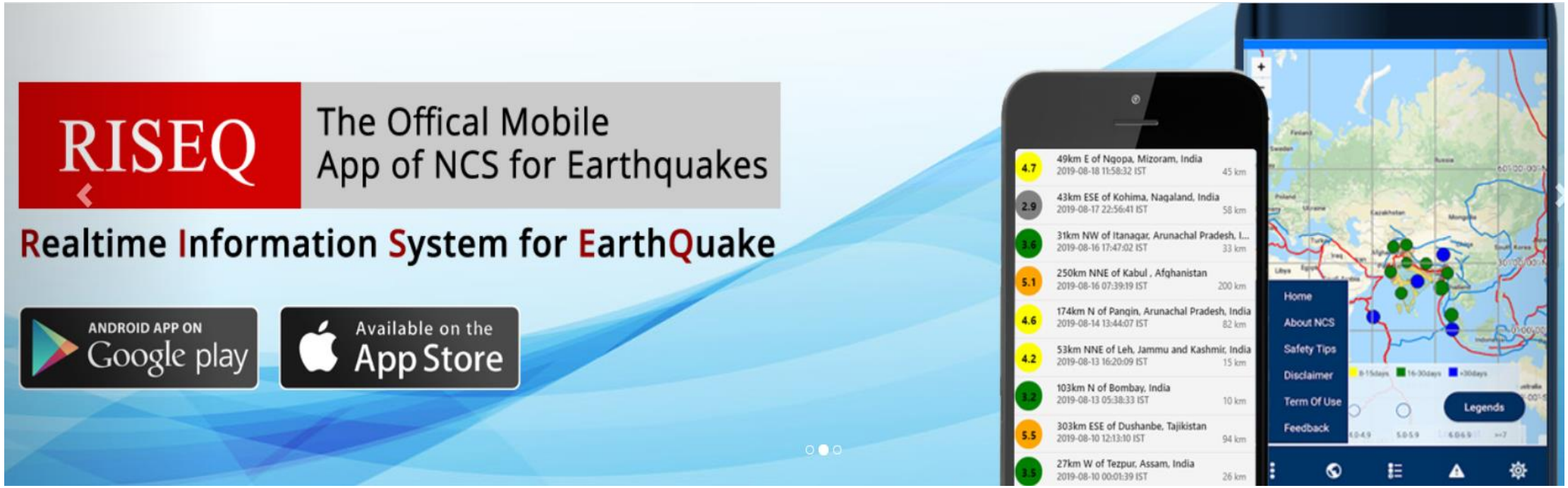
- Earthquake Catalogue
- Historical Seismograms
- Seismological Bulletins

Earthquake Safety

- Do’s and Don’s
- MMI Scale
- Seismology Glossary

Other Services

- Mobile App



https://seismo.gov.in/

Hydrology Laboratory

- National Institute of Hydrology is an autonomous society under Ministry of Water Resources, River Development & Ganga Rejuvenation, Government of India and has been functioning as a research Institute in the area of hydrology and water resources in the country since December 1978 in Roorkee City.

Aim & Mission

- To provide leadership in hydrology research through effective scientific solutions for achieving sustainable development and self-reliance of the water sector in India.
- Develop new techniques, procedures, software packages, field instrumentation, etc. for hydrological studies.
- Study scenarios of water resource availability under varying Hydrological, climatic, sociocultural conditions through modelling techniques.
- Assess impact of climate change on water resources and suggest measures for mitigation, adaptation and resilience.
- Propagate applications of emerging techniques for water resources development and management.
- Provide cost-effective R&D solutions to need-based water related problems.
- Provide scientific advice to the various stakeholders on water related issues.
- Empower community through capacity building and awareness on water resources development and conservation.

R&D

The institute is focusing studies and R&D in the thrust areas of

- impact of climate change on water resources
- integrated water resources management
- groundwater modeling and management
- flood and drought management
- regional hydrology
- hydrology of extremes
- reservoir/lake sedimentation
- watershed hydrology
- water quality assessment in specific areas.

Objectives

NIH carries out basic, applied, and strategic research in hydrology and water resources. It aims to develop methodologies for the optimum utilization of water resources, to develop methodologies for water and environmental sustainability, to propagate emerging technologies in water resources development, to protect the society from water related hazards, and to develop mass awareness for water conservation and optimum utilization. The specific objectives of NIH are as follows:

(1) To undertake, promote, assist, and coordinate systematic research and work in all aspects of hydrological sciences and other water-related disciplines, and to publish the findings and results of research and investigations through appropriate offline and online media.

(2) To carry out modeling and other advanced techniques to aid in the resolution of pressing societal issues concerning water quantity and quality, including floods, droughts, groundwater, sedimentation, salinization, pollution, and climate change.

(3) To research and develop novel, cost-effective tools, techniques, methodologies, procedures, software, and field and laboratory instrumentation, to aid in the performance of its mission.

(4) To establish and maintain a live, dynamic and committed resource base in terms of staff, laboratories, equipment, libraries, and specialized expertise in hydrological sciences and other water-related fields.

(5) To propagate across society-at-large the application of emerging technologies in water resources development and management.

(6) To develop, maintain, and continuously improve its online presence to ensure the widest dissemination of its research.

(7) To collaborate with appropriate national and international organizations engaged in research in hydrological sciences.

(8) To carry out other activities that are considered by the NIH Society to be necessary, incidental, or conducive to the attainment of its mission.