

GEOLOGICAL SURVEY OF INDIA



NATIONAL GEOCHEMICAL MAPPING

STANDARD GEOCHEMICAL MAP

Toposheet coverage

45 K/1	45 K/5	45 K/9	45 K/13
45 K/2	45 K/6	45 K/10	45 K/14
45 K/3	45 K/7	45 K/11	45 K/15
45 K/4	45 K/8	45 K/12	45 K/16

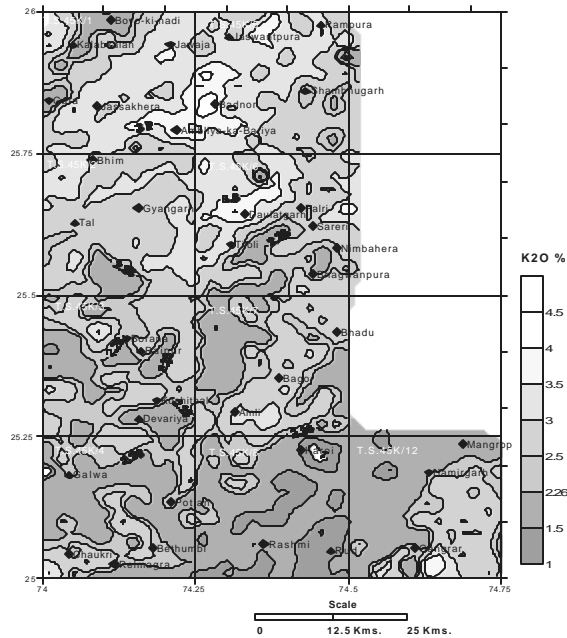


Fig. 5a .Map showing distribution of K₂O in stream sediment samples of 2 Km composite cells in toposheets 45K/1,2,3,4,5,6,7,8 &12, Ajmer,Rajasamand ,Bhilwara and Chittaurgarh districts ,Rajasthan.

The stream sediment samples for every sq. km and its composite for four adjacent 1 sq. km cell are being preserved at departmental storage facilities to last for more than 20 years. Also the database of chemical analysis as well as other types of ground related information is being maintained through the Geological Survey of India's portal.

The Geological Survey of India is covering almost 25,000 sq.km annually, by geochemical mapping, at national level.

2006, Kolkata

Preamble

As a national organisation Geological Survey of India has always been sensitive to the immediate needs of the nation. Today's needs are in the domain of environment, agriculture and human health. All of them have links with geology through the medium of soil, water and to a lesser extent, air.

Throughout its 150 years long history the organisation has contributed to the nation building activities by discovering and adding new raw materials and mineral resources. In the post independent era the country has become self-sufficient in the many minerals and raw materials like iron, coal, limestone, copper, lead-zinc etc. Geological Survey of India has completed the geological mapping of the entire country besides rendering invaluable help in the construction of national structures like large dams, reservoirs and mountain roads etc. In recent years it has expanded its exploration activity in the Antarctica and EEZ of the country.

By a proclamation made in the 'Vision 2020 document' the Geological Survey of India was committed to enter into the field of Geochemical Mapping, a programme of great societal relevance. The mapping of this nature is a systematic move to be conducted across the length and breadth of the country employing a significant man power resource from different geoscientific streams of the department. Its main objective is creation of a baseline data of the country by measuring 68 elements with 'state-of-the-art' instruments capable of measuring with lowered level of detection to crustal abundance. Not only the chemical results will meet the International Standards but the elemental maps generated from the survey will benefit the environmentalists, the agriculturalists and health authorities in their perspective planning. Such surveys have benefited the mineral industry also if the case of China is taken as an example. China located nearly 158 new mineral deposits out of more the 700 newly discovered occurrences, which made it the largest supplier for several metal and non-metal commodities, in the world since mid-nineteen nineties.

Geological Survey of India launched the National Geochemical Mapping (NGCM) programme, simultaneously, from all its Regional Headquarters from the field season 2001-02

SAMPLING PROCEDURE & ANALYSIS

The main sampling media of National Geochemical mapping is "stream sediment" (sieved to -120 mesh) collected from first or second order streams from every sq. km area in the 1:50,000 scale toposheet. It is proposed to geochemically map each toposheet till the degree sheet is covered. The stream sediments are being supplemented by soil (from top and from 'C' horizon) collected at 5' interval in the toposheet. Other optional sampling media are flowing water (at every 5'), humus and flood plain material, subject to their availability.

The stream sediments are being collected at every 1 sq. km interval, thereby generating nearly 700 samples in every toposheet. Four samples from adjacent 1 km cells are composited and analysed in the Geological Survey of India laboratories for various packages of elements.

The major packages are:

1. XRF - SiO₂ (1000 ppm), Al₂O₃ (1000 ppm), Fe₂O₃ (1000 ppm), MgO (1000 ppm), MnO (1000 ppm), Na₂O (1000 ppm), K₂O (1000 ppm), P₂O₅ (100 ppm)
Ba (50 ppm), Co (1 ppm), Cr (1 ppm), Cu (1 ppm), Ga (5 ppm), Nb (5 ppm), Ni (2 ppm), Pb (2 ppm), Rb (3 ppm), Se (3.5 ppm), Sr (5 ppm), Th (4 ppm), U (3 ppm), V (20 ppm), Y (5 ppm), Zn (10 ppm), Zr (5 ppm).
 2. **GF-AAS** - Au (3ppb), Cd (0.2 ppm), Ag (0.02 ppm)
 3. HG-AAS- As (1 ppm), Sb (0.2 ppm), Bi (0.1 ppm), Se (0.1 ppm ?)
 4. **GF-AAS**- Cd (0.2 ppm), Ag (0.02 ppm)
 5. **I S E - F** (100 ppm)
 6. Hg-analyser- Hg (5 ppb)
 7. ICP-MS - La, Ce, Pr, Nd, Eu, Sm, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu (ppb level) Sn (1 ppm)+, In (0.03 ppm), Hf (0.5 ppm), Ta (0.2 ppm), Mo (0.5 ppm)+, W (0.5 ppm)+, Ge (0.05 ppm), Be (0.3 ppm), U (0.5 ppm)
- () Lower detection limits

The standard reference materials (SRMs) are being used for instrumental calibration as well as analysis validation.