

BOOK REVIEW

GEOHERMAL ATLAS OF INDIA. Geological Survey of India – Special Publication 19, 1991.

Geothermal energy in the form of hot water and/or magmatic fluids emanating from 'hot springs' or geysers is a possible source of energy for various purposes. Virtually inexhaustible (or infinitely renewable), as opposed to the fast-depleting fossil and other non-renewable fuel sources, geothermal energy is non-polluting and environmentally acceptable.

Thermal (or hot springs) are fairly widespread throughout the continents (and seas) of the earth, including India.

The Atlas is a commendable effort by the Geological Survey of India to bring together all available information (up to 1989) on thermal springs in India. The intention is to draw attention to this relatively little-known source of energy and to provide basic information for further investigation and possible utilisation.

A 1968 report by a 'Hot Spring Committee' set up by the Government of India in the early sixties led to a pilot investigation/utilisation project by the Geological Survey of India in 1973. The Atlas comprises information collected by the Geological Survey since that date as well as from other organisations such as the National Geophysical Research Institute, the Oil and Natural Gas Commission and various Universities.

The Atlas lists 303 (of the known 340) thermal spring localities which have been investigated, grouped into 113 'systems' in 10 well-defined 'provinces'. The locations of these springs extend from Ladakh in the Himalayas in the north to Kerala and the Andaman and Nicobar Islands in the south. Most of the springs are of relatively low-flow and medium ($110^{\circ}\text{C} \pm 20^{\circ}\text{C}$) computed reservoir temperature. Only a few areas have high ($175^{\circ}\text{C} \pm 25^{\circ}\text{C}$) temperature. These areas are mostly in the central and northern States and appear to be located where direct channels exist between surface and points at depths of 1.5 km to 3 km.

Basically geothermal activity is considered to have a close relationship with relatively young magmatic episodes in areas of Tertiary orogeny and block-faulting and/or fault-bound blocks with evidence of Tertiary and Quaternary reactivations. Thermal activity is strongest in the vicinity of the Himalaya plate margin.

An attempt is made to correlate characteristics of areas of thermal activity with geologic segments and delineate areas where geothermal 'reserves' of between 60°C and 150°C could reasonably be anticipated at depths of up to 3 km.

As regards the use of geothermal energy for generation of power, the present (binary) system requires not only a copious flow but also considerable quantities of cold water, a possible drawback in some areas. Some of the hot springs also have heavy concentrations of salts.

A tentative theoretical estimate is that 10,000 MW of power could be extracted from the known sources of geothermal energy in the country. It would appear that most of the sources are more suitable for such applications as the heating of buildings and other relatively low temperature uses.

A mention could have been made of the possibility of extracting geothermal energy from the Kolar mines, which are already over 3 km deep, with a virgin rock

temperature at that depth of at least 75°C. The title 'Thermal Springs of India' would have been perhaps more appropriate, for there is little else in the Volume apart from a description of the hot springs in the different states of the Indian Union.

The assertion on p. 1 that "Needless to emphasize that 'geothermal energy' is presently recognised as the only one of the so-called alternate renewable energy resources which is technically, commercially and economically viable for generation of electricity in many parts of the world" appears to ignore hydro-electric and solar power, which have already reached that stage, and ocean-wave-power which is likely to do so in the near future.

The Atlas, with 55 plates, 39 tables and a sprinkling of photographic (colour) illustrations, contains a wealth of information of value to geoscientists of all persuasions. As a reference book, it should find a place in the libraries of all institutions concerned with geological phenomena and research and future energy sources and utilisation.

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ANNOUNCEMENTS

First South Asia Geological Congress, Islambad, Pakistan : February 23-27, 1992. GEOSAS-I will cover the ECO and SAARC countries, namely, Turkey, Iran, Pakistan, India, Nepal, Bhutan, Bangladesh, Maldives and Sri Lanka. This region forms a geographical and geological entity stretching across southern Asia over a land area of about 7 million square kilometre inhabited by over one billion people. The region has a complex geodynamic history with tectonic activities continuing even today. Geologically, it is characterized by the presence of shields, cratons, platforms as well as magnificent fold belts, many of which cross national frontiers and extend into neighbouring countries. The region is endowed with rich resources of water, oil, gas, coal and industrial and metallic minerals, but many of its riches remain unexplored and unexploited. A concerted effort is, therefore, needed to study the geological features and their genesis in the region, not only for scientific advancement but also for optimum use of the potential resources in an environmentally benign manner. GEOSAS-I will provide a platform for professional exchange of views to achieve these goals and will lay the foundation of subsequent Congresses in the region.

The objectives of the South Asia Geological Congress are :

- * To provide a forum to the geoscientists of the region for exchanging professional ideas and to discuss common geological problems with international experts.
- * To increase the competence of the participating countries in better understanding and utilization of the earth's resources while sustaining the environment.
- * To find avenues of regional trade of geological commodities to mutual benefit.
- * To attract investment for exploration of earth's natural resources by disseminating geological information.
- * To help in training earth scientists of the region.