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Centre for Geothermal Energy Research (CGER) at CSIR–NGRI, Hyderabad: Advancing sustainable geothermal energy in India

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INTRODUCTION

The CSIR–National Geophysical Research Institute (CSIR–NGRI), Hyderabad (India), is country's unique geoscientific research institution, dedicated to research investigations spanning from near-surface processes to deep Earth exploration with a strategic focus on natural resource exploration (groundwater, mineral, geothermal energy, and hydrocarbon) and hazard assessment for sustainable development. Among various renewable energy resources, geothermal energy stands out as a reliable, clean, and sustainable resource, capable of providing continuous baseload power, independent of climatic or seasonal variability (Gupta and Roy, 2007). Leveraging its multidisciplinary expertise in geological, geochemical, and geophysical sciences, CSIR–NGRI, the Geological Survey of India (GSI) and other institutions, have led national efforts that have resulted in the delineation of ten geothermal provinces across the country's diverse tectonic settings (Figure 1). Although India possesses considerable geothermal potential, particularly in regions with hot springs, this resource remains largely untapped.

CSIR–NGRI has a long-standing legacy in geothermal research, spanning over six decades, with pioneering contributions in heat flow measurements, subsurface temperature mapping, characterization of rock thermal properties, geophysical imaging, and geochemical analyses across various geological terrains in India (Saxena and Gupta, 1986; Patro, 2017; Ray, 2021).

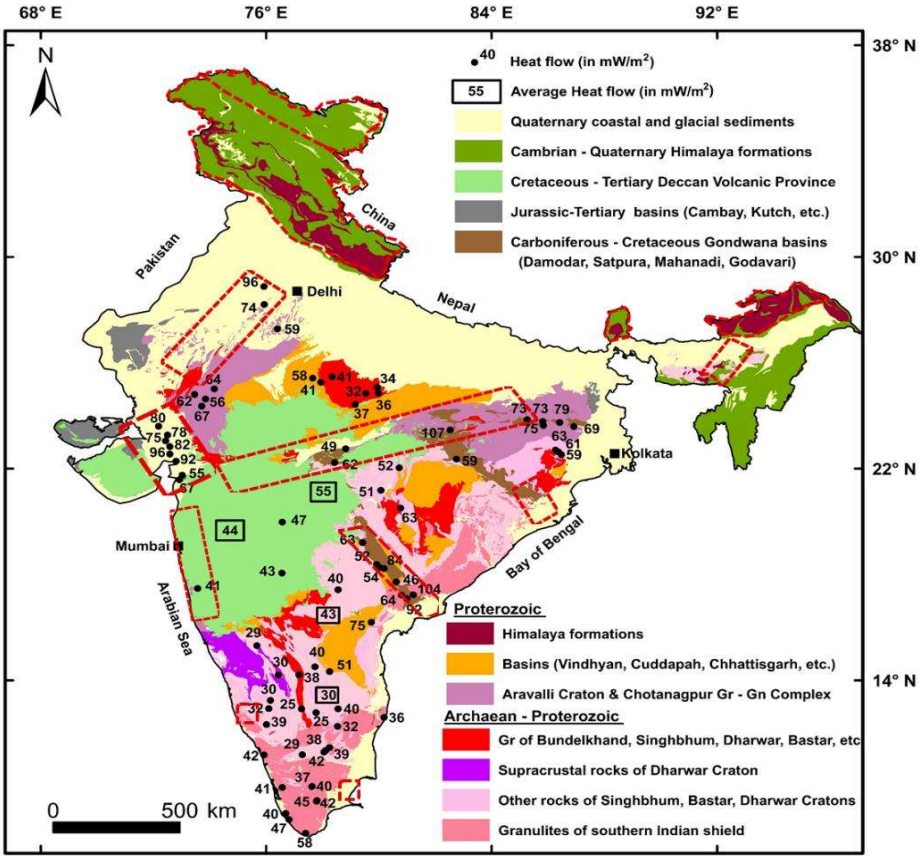

Figure 1. Geological map of India showing geothermal provinces (modified after GSI, 2022) along with heat flow distribution.