Geophysical Research Abstracts
Vol. 12, EGU2010-9991, 2010
EGU General Assembly 2010

Tectonic Controls on Radon in Soil-gas and Groundwater of Kangra-Chamba region, Himachal Pradesh, India

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The studies in the Himalayan region have demonstrated that the tectonic processes, types of rocks and geohydrological characteristics of rock mass control the concentration of radon in soil gas and ground water. The area (Kangra-Chamba region of Himachal Himalaya) under present study shows the sign of neotectonic and seismic activity. Therefore, an attempt has been made to study the relation between radon concentration in soil-gas and groundwater with the tectonic structures and associated regional structures in the study area. The major thrusts cutting across the area are: Chamba Thrust, Jawalamukhi Thrust, Main Boundary Thrust and Panjal Thrust. For systematic study, the area has been divided into three Zones on the basis of lithology and thrust systems of the area viz. Zone-I, Zone-II and Zone-III. More than seventy-five soil gas samples were collected and analyzed (using RAD-7) for radon concentration varying between 4 -58 KBq/m3. The water samples have been collected from the different sources and wide range of the villages lying within the area under consideration. The radon concentration in groundwater was also measured using RAD-7 equipped with an appropriate unit (Aqua kit) following a protocol proposed by the manufacturer. The radon concentration in water samples has been found to be varying from 8.4Bq/l to 314Bq/l. It is inferred from the present study that the wide variation observed in radon concentrations in soil gas and ground water may not be only due to variation in geological formations of the respective regions, but can also be the due to different thrust systems and the active faults present in these areas.