Widespread Ground Fissures in the Northern Flank of Indian Peninsular Shield Caused Due to Ground Water Depletion and Extreme Rainfall – Inference From Multi Sensor Data Analysis

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During June 2008, widespread fissures were observed at numerous places in the northern flank of the Indian Peninsular shield of the Indo-Gangetic plains. These fissures were found to narrow up to 2 km long and emerged after the excessive rainfall. At some places these cracks/fissures were found to be deep up to 1 meter. The emergence of such cracks in wide spread regions attracted the attention of people living in the surrounding regions and people and scientific community thought a sign an impending earthquake. A detailed analysis of multi sensor (GRACE, TRIMM, AMSR) and ground data were carried out to study the water storage equivalent from GRACE, rainfall and soil moisture for longer periods. The rainfall data for the last 20 years show a declining trend which was supported by the declining trend of soil moisture for the period 2000 - 2008, showing poor recharge of ground water in the region. The monthly water storage equivalent retrieved from GRACE satellite data also show a low water storage in the region showing declining ground water table which is quite obvious due to the poor monsoon and population growth in the last decade. The multi sensor data reveal the formation of wide spread cracks and fissures due to slow and sharp gradient in the stress due associated with the change in moisture level due to excessive rainfall.