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Earthquake relocation using the double difference method in the Augrabies area

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In this study, data from 2010 to the end of 2011 was collected from a number of stations within the National Seismograph Network in order to study the seismicity of the Augrabies area. The main aim of the study was to investigate the geology of Augrabies using fault maps and the HypoDD method and to find the possible faults responsible for the seismicity in the area. This was done by comparing the locations found from the relocation method with the faults in the area.

After the relocation and correlation of events with the geology, no particular faults were identified which were directly associated to the seismicity. However, seismicity was located mainly along a dyke with North East, South West orientation. Initially, the first few runs of the program located some events along the Orange River but on the final and most accurate run or relocation, the cluster moved across the river indicating an extension along the vertical axis and shortening along the horizontal axis.

There are suspicions that the Riemvasmaak hot springs could have a contribution to this seismicity and the results of the relocations strongly support these suspicions. Perhaps both the seismicity and the hot springs are end members of a deeper dynamic process beneath the area. This has led to the conclusion that these narrow elongated zones of seismicity may be due to a combination of both faults and dykes. It was then decided that further investigations should be performed in the Augrabies area for a better understanding of its stress pattern and dynamics.