Geophysical Research Abstracts
Vol. 14, EGU2012-5939, 2012
EGU General Assembly 2012

Reservoir-induced seismicity at Castanhao reservoir, NE Brazil

B. Nunes (1), A. do Nascimento (1), J. Ferreira (1), and F. Bezerra (2)

(1) Department of Geophysics, Universidade Federal do RIo Grande do Norte, Natal, Brazil, (2) Department of Geology, Universidade Federal do RIo Grande do Norte, Natal, Brazil

Our case study – the Castanhão reservoir – is located in NE Brazil on crystalline rock at the Borborema Province. The Borborema Province is a major Proterozoic-Archean terrain formed as a consequence of convergence and collision of the São Luis-West Africa craton and the São Francisco-Congo-Kasai cratons. This reservoir is a 60 m high earth-filled dam, which can store up to 4.5 billion m^3 of water. The construction begun in 1990 and finished in October 2003.The first identified reservoir-induced events occurred in 2003, when the water level was still low. The water reached the spillway for the first time in January 2004 and, after that, an increase in seismicity occured. The present study shows the results of a campaign done in the period from November 19th, 2009 to December 31th, 2010 at the Castanhão reservoir. We deployed six three-component digital seismographic station network around one of the areas of the reservoir. We analyzed a total of 77 events which were recorded in at least four stations. To determine hypocenters and time origin, we used HYPO71 program (Lee & Lahr, 1975) assuming a half-space model with following parameters: VP= 5.95 km/s and VP/VS=1.73. We also performed a relocation of these events using HYPODD (Waldhauser & Ellsworth, 2000) programme. The input data used we used were catalogue data, with all absolute times. The results from the spatio-temporal suggest that different clusters at different areas and depths are triggered at different times due to a mixture of: i - pore pressure increase due to diffusion and ii - increase of pore pressure due to the reservoir load.