Geophysical Research Abstracts, Vol. 7, 02281, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02281

Hydrological influences on gravity observed at the Geodynamic Observatory Moxa/Germany

C. Kroner, Th. Jahr

Institute of Geosciences, Friedrich-Schiller-University Jena, Germany
(corinna.kroner@uni-jena.de / Fax: +49 3641-948662)

A noticeable hydrological influence can be identified in the continuous gravity monitoring at the Geodynamic Observatory Moxa which is carried out with a superconducting gravimeter. Subsequent investigations led to the identification of three principle areas from which effects originate: the hilly area above the gravimeter level, the valley bottom below the instrument, and the immediate area directly above and below the gravimeter. The resulting gravity effect ranges from some nm/s^2 to more than 10 nm/s^2 depending on the area. Besides changes in soil moisture and groundwater level water flow can be observed. The main flow path is probably running from the hill top through the weathering layer and clefts downwards below the observatory. This makes Moxa interesting for hydrogeologists. The local situation allows to study to which extent observations of gravity changes can provide a mean to validate and parameterise hydrological modellings esp. for hilly areas. For this as well as for the development of reliable correction algorithms experiments (among them one injection and two irrigation experiments) have been carried out. Each time a defined amount of water was added to a specific area in the gravimeter vicinity and the resulting gravity effect and hydrological variations observed. The gravity changes due to the propagation and dispersion of a water front which runs downhill can be successfully described by time-dependent changes in the water filled pore volume.