



Evidence for high fluid/melt content beneath Krakatau volcano (Indonesia) from local earthquake tomography

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Within the KRAKMON project for multiparameter monitoring of Anak Krakatau volcano (Indonesia), a network of temporary stations was installed on the islands of the Krakatau complex as well as in the surrounding areas of the Sunda Strait, Sumatra and Java. The network was operated from June 2005 until January 2006. More than 700 local events were recorded during this experiment, and travel times from these events were used to perform a tomographic inversion for P and S velocities and for the V_p/V_s ratio based on the LOTOS code. Special attention was paid to the validation of the computed model based on different tests, such as: inversion of independent data subsets, using different starting models, as well as various synthetic tests. Although the network configuration and the distribution of the events are not favorable for high-quality tomographic imaging, we have obtained some important and robust features which give information on deep sources of volcanic activity in the Krakatau complex. Large anomalies of low P and S velocities are observed around the Krakatau complex including Sebesi volcanic Island. At the same time, a smaller isometrical pattern of ~ 5 km diameter with an anomalously high V_p/V_s ratio is concentrated just beneath Anak Krakatau. We suppose that low velocities beneath the volcanic complexes in the Sunda Strait are mostly due to elevated temperatures. However, normal and low values of V_p/V_s ratio in most areas indicate that this temperature anomaly does not lead to melting. Only beneath Anak Krakatau, where most of the volcanic activity takes place, we found a zone of anomalously high V_p/V_s ratio which reflects high fluid/melt content. We suppose that this pattern is an indicator for a magma chamber beneath this one of the most active volcanoes in the world.