Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08742, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08742
EGU General Assembly 2008

Lg-Blockage in the wester Pyrenees explained with locally increased heterogeneity based on Radiative Transfer Theory

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Lg-waves consist of reverberant S-waves that are guided in the crust between surface and Moho. In the western Pyrenees these waves experience anomalously strong attenuation. The shape of seismogram envelopes, recorded after the passage through the Pyrenees depends strongly on the location where the waves crossed the mountain range. In the western Pyrenees the crustal phases disappear almost completely from the seismograms that are dominated by the mantle phases. This process is called Lg-Blockage. Detailed analyses of this phenomenon showed that the macroscopic velocity structure can not account for the blockage. We model the propagation of energy through the Pyrenees with elastic radiative transfer theory that takes into account scattering at small scale heterogeneities and conversion between P- and S-energy. The model includes conversions/reflections at the surface and at the depth of the Moho. This allows to model the guided Lg-waves. Additionally the model contains a cuboid body representing the material below the western Pyrenees. We show that the observed blockage of Lg-waves can be explained with increased heterogeneity below the western Pyrenees. Intrinsic attenuation can be ruled out as sole cause. With this analysis we propose an explanation for the so far unexplained phenomenon of Lg-Blockage by mountain ranges.