

Ground-coupled air waves and diffracted infrasound from the Kokoxili Earthquake, 14th Nov. 2001

A. Le Pichon ¹, J. Guilbert ¹, M. Vallée ², B. Alcoverro ¹, M. Ulzibaat ³

¹CEA/DASE BP12, Bruyères-le-Châtel, France

²LGIT, 38400 St. Martin-d'Hères, France

³Mongolian Academy Center, RCAG, Ulaanbaatar-51

Abstract. On November 14, 2001, a strong earthquake measuring Mm 7.8 occurred in the Qinghai Province (China). Coherent infrasonic waves were detected during more than one hour by the I34MN infrasound station in Mongolia (~1500 km from the epicenter). Using an appropriate acoustic propagation model, the inversion of the infrasonic measurements allows a precise localization of the secondary sources distribution. The predominant source of infrasound is likely ground-coupled air waves generated by the strong variations of topography due to energy carried out by surface seismic waves that travel from the epicenter region through the Qinghai mountains. To confirm the locations of these distant source regions, the pressure field has been reconstructed at I34MN. For each element of the topography, a synthetic seismogram used as an input of the integral relation of Huygens-Rayleigh permits to estimate the pressure variation. The synthetic pressure field fit the recorded data in azimuth and in relative amplitude. These results confirm the hypothesis of a strong coupling between the Rayleigh waves and the atmosphere, as it has already been observed during the Arequipa earthquake of June 23rd 2001. The simulations also permit to validate the infrasonic velocity model. This favorable setting within a region of high mountains makes easier the evaluation of the relative contribution of the different source mechanisms involved in large earthquake.