ID: Type: **Oral**

T3.4-O3. Numerical study of acoustic waves around and inside an underground cavity

While the logistic aspects of an OSI have already been tested several times in realistic exercises, the technical questions are quite new and a strong scientific base is still pending. Furthermore, only very few experiments have been conducted using the seismic techniques listed by the Treaty to detect evidence of a cavity caused by an underground nuclear explosion. This motivates to investigate this problem on a purely numerical level and to simulate these events, taking into account recent advances in the mathematical understanding of the underlying physical phenomena. We believe that this will help provide a strong scientific base for OSI. To begin with, we focused our numerical study on the propagation of P-waves in two dimensions. An extension to three dimensions as well as an inclusion of the full elastic wave field is planned in the following. Our computations are done with the parallel High-Order Finite Element Library Ngsolve ontop of the automatic 2D/3D tetrahedral mesh generator Netgen. The accurate numerical modeling will help to facilitate the development of proper analysis techniques to detect the remnants of an underground nuclear test, strengthen the scientific base of OSI and contribute to bringing the Treaty into force.

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Track Classification: 3. Advances in sensors, networks and processing