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PGV-prediction for production blasts at the iron ore mine Mt. Erzberg, Austria

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A seismic site characterization of the iron ore mine at Mt. Erzberg was performed in November 2016. The covered area measured about 4 km² within the active mine and the surrounding village. Within 4 weeks 125 3-component-geophones recorded 31 seismic events including production blasts. This data allowed for the computation of P and S velocity models. Which in turn were the basis for seismic wave field modelling with an elastic FD code. These simulations were used to calculate optimized blasting patterns for minimal vibrations at sensitive targets, like settlements and infrastructure, which were tested in a second and third experiment in June and October 19. (see contribution by Trabi et al.)

In this study a statistical analysis of the resulting PPV-vector at any given geophone position was done, utilizing recorded blasts from 3 experiments. Using a scaled distance method, one can establish relationships between blast intensity, distance and ground vibrations. When compared to the PPV prognosis from the simulations, this analysis allows for assessments on prediction accuracy. General trends in PGV estimation can also be used to create site amplification factors to further enhance optimized blasting pattern calculations.

This study is part of a large interdisciplinary EU funded project called SLIM, which focuses on sustainability in mining.