In this paper we present acoustic emission (AE) data recorded in hypervelocity impact experiments. In particular we focus on the presentation of the experimental setup and the data analysis. The AE data are used to localize the impact point, to analyze the propagation of the compressive wave in the target, and to calibrate specific material properties under dynamic conditions required in numerical simulation of impact cratering and the propagation of shock waves. We present a detailed comparison between experimentally determined data and numerical models. Additionally, we measured the wave velocity of the material with ultrasound tomography before the impact and compare the expected travel time of the compressional wave at each sensor with the arrival time of the compressional wave recorded by AE technique during an experiment under dynamic conditions. We recorded the stress signal in numerical models at gauges that were located at exactly the same positions as the AE sensors. A good agreement has been found between experimentally and numerically determined wave speeds. The impact experiments provide information about wave
propagation that may contribute to a better understanding of the generation of earthquake-like seismic waves during the hypervelocity impact of a meteorite on earth. The calibration of numerical models is of particular importance for the up-scaling of the experimental results.

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