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Infrasound observations and source mechanisms of the September 28th 2018 Sulawesi earthquake

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A magnitude 7.5 earthquake with subsequent tsunami occurred on September 28th 2018 at 10:02:45 UTC near the city of Palu on the Indonesian island of Sulawesi. Clear and long-lasting infrasound signatures related to this event were observed by at least two infrasound arrays of the International Monitoring System (IMS) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).

Although these IMS stations IS39 and IS07 in Palau and northern Australia are more than 1800 and 2700 km away from the earthquake's epicenter, distinct signals including seismic and acoustic arrivals were recorded at the infrasound arrays and associated to the event. Nevertheless, the precise infrasound generation mechanism is still not well understood. The super shear nature of the rupture, the following landslides and tsunami as well as the seismoacoustic coupling to nearby terrain features may have an impact on the infrasound emitted and subsequently observed.

A detailed study of the event-related observations and the potential infrasound generation mechanisms is presented covering range- and time-dependent infrasound propagation modeling, realization and variation of the atmospheric background conditions as well as comprehensive data analyses of a large number of infrasound stations in the area, some of them showing additional signal features possibly related to the event.