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Infrasound signals coupled from an underwater explosion

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On 26 March 2010, a South Korean warship, Cheoanham, was sunken down offshore of an island, Bakryeong, in the Yellow Sea, South Korea. In the island that is near to the incident site, were a seismo-acoustic array and a broadband seismic station in operation. These stations recorded clear seismic and infrasonic signals associated with the warship-sinking. In addition, five infrasound arrays being operated in the inland of South Korea also detected the infrasound signals propagated up to 348 km from the source. We studied the seismic and infrasonic signatures from the event for the determination of exact source location and explanation of coupling phenomena among three different media; sea, solid earth and atmosphere. For the accurate source localization we fused all the available seismo-acoustic information of arrival time and azimuth estimates of coupled seismic and infrasonic signals. The calculated location is nearly coincident with the event location reported by the Civilian Military Joint Investigation Group, which shows seismo-acoustic location is much better than those calculated with just seismic or infrasonic dataset. The relationship between explosion depth and charge was constrained with the period of the observed infrasonic signals. The attenuated amplitude of infrasound signal was corrected to estimate the perturbed air pressure at source location.