The 12 September 2016 M_L 5.8 Gyeongju, Korea, earthquake: Observation and questions

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The M_L 5.8 earthquake in Gyeongju, southeastern Korea, on September 12, 2016 11:32:54 (UTC) was the largest earthquake on the Korean Peninsula since instrumental monitoring began in 1978. It was preceded by an M_L 5.1 foreshock and is being followed by numerous aftershocks. Within an hour of the mainshock, the first temporary seismic station to monitor aftershocks was installed at about 1.5 km east of the announced epicenter. The temporary seismic network consists of 27 stations equipped with broadband sensors covering an area of about 38 x 32 km^2 in the mainshock region. This is the first high-density aftershock monitoring array in the Korean Peninsula. Initial results, using data from both the regional seismic networks and the aftershock monitoring array, indicate that earthquakes during the first 10 days following the mainshock are related to the Yangsan Fault System. The 2016 Gyeongju events have now become forceful reminders that earthquakes have occurred in the past and can hit the region again at any time. These earthquakes provide an opportunity to reaffirm aspects already known based on evidence from both historical (literature) and seismological data. Moreover, the occurrence of the 2016 Gyeongju earthquakes has motivated more detailed studies of the Yangsan Fault System and a reexamination of the previously held consensus regarding the fault system. The most frequently asked questions during the Gyeongju earthquake crisis are as follows: Are there any active faults in the source area? Which faults are responsible for the mainshock–aftershock sequence? Is the Yangsan fault active? Is it possible to release information regarding impending earthquake activity? How long will the aftershocks continue? What is the next earthquake scenario and how to model it? These issues will be discussed on the basis of the aftershock monitoring data.

Keywords: Gyeongju, Korea, earthquake, responsible fault, future earthquake scenario

