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Seismic monitoring of Nature's Heat Geothermal Project in Kwintsheul (Netherlands)

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In 2018, a geothermal doublet started operating in Kwinstheul, Netherlands, for supplying heat to 64 hectares of greenhouses corresponding to Nature's Heat joint initiative. This kind of geothermal operation requires extraction, circulation, and reinjection of fluids at a depth of 2.4 km. The reservoir used for the geothermal operation has shown good hydraulic parameters which allow the circulation of the fluid. Several authors agree that this kind of geothermal operation is unlikely to generate felt seismicity, nevertheless, adequate seismic monitoring is critical to guarantee sustainable and safe use of the subsurface. To monitor the operation of Nature's Heat project, 30 three-component short-period seismic sensors were installed by Delft University of Technology and Seismotech (Greece). A challenge for seismic monitoring in Kwinstheul is the high levels of seismic noise coming from anthropogenic and operational activities. Despite the high background noise levels, a seismic event of Md 0.16 was recorded on July 14, 2019. To understand the relation of the event and improve the safety of the geothermal operation, we are developing an optimized monitoring scheme.