Stratospheric Gravity Wave Activity Before the 2024 Noto Peninsula Earthquake: A Preliminary Result

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The Earth’ s atmosphere and ionosphere are affected by seismic activities through lithosphere-atmosphere-ionosphere coupling (LAIC) processes. Even some precursory anomalies can be found in the atmosphere and ionosphere several days to a few weeks before a major earthquake. In recent decades, several hypotheses have been proposed to explain the mechanisms of LAIC. In this presentation, we estimated the activity of atmospheric gravity waves (AGWs) in the stratosphere (about 15–45 km altitude) above Japan before the 2024 Noto Peninsula Earthquake. AGW activity was significantly enhanced at 33 km altitude around central Japan just one day before the earthquake. This enhancement does not seem to correlate with severe weather systems, and it is plausible to be a precursory phenomenon caused by the earthquake that occurred the following day. The abnormality of stratospheric gravity wave activity observed before the 2024 Noto Peninsula Earthquake further supports the AGW hypothesis of LAIC after our previous reports of the 2011 Tohoku and 2016 Kumamoto Earthquakes.

Keywords: Earthquake, Lithosphere-atmosphere-ionosphere coupling, Atmospheric gravity waves

