

## Background free oscillations of the atmosphere and solid earth system

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From the first detection of Earth's background oscillations, this phenomena has been emphasized as one of the atmosphere and solid earth interaction phenomena. In this phenomena, there are two modes OS29 (3.7 mHz) and OS37 (4.4 mHz) that have exceptionally large amplitude and anomalous annual variations. These features might be constructed by resonance oscillations between solid earth and atmospheric normal modes (Nishida et al., 2000). In this study, we analyzed the earth's background oscillations as oscillations of 'a coupled system' of atmosphere and solid earth with seismic data analysis and normal mode calculations in a coupled system of atmosphere and solid earth. We found these modes and other excess amplitudes existed on branch crossings of fundamental spheroidal modes and atmospheric normal modes and excess amplitudes were reproduced as background oscillations of the coupled system excited by single forces distributed in the atmosphere. Excess amplitudes and larger annual variation of these characteristic modes could be attributed to the structural features of the coupled system. Earth's background continuous oscillations is not only the interaction phenomena of two systems of the atmosphere and the solid earth. That is the whole earth oscillation.