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Contribution of infrasound monitoring to a global study of the upper atmosphere dynamics

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The development of the Infrasound International Monitoring System, used for the verification of the Comprehensive Test Ban Treaty, offers a powerful way to measure permanently at a global scale the disturbances of the atmosphere. Infrasound stations using several microbarometers are very sensitive acoustic antennas, measuring, among others parameters, wave velocity and azimuth. Associated with new data processing methods, a global analysis of the atmospheric disturbances is now possible in a large frequency range. Infrasound propagates in the acoustic channel formed by the temperature and wind gradients of the atmosphere. Inversion of wind profiles between altitudes of 50 and 110 km has been performed, using the quasi continuous infrasound emissions of the Lopevi volcano measured during one year by the station I22FR of New Caledonia. Continuous monitoring of infrasound produced by active volcanoes and ocean swell is then proposed as a remote sensing method to provide a more accurate description of the wind fields in the stratosphere and mesosphere were routine measurements still remain illusive. A monitoring of the gravity wave activity in the Antarctica station I27DE reveals two active gravity wave systems. The first is related with waves produced in the troposphere with the wind over the relief. The second system could be submitted to the influence of the polar vortex of the stratosphere which is an important part of the atmospheric global system. The effect of magnetic storms on these wave systems is also examined.