

# Atmospheric gravity waves derived by simultaneous observations of all-sky imagers, a sodium lidar, and foil chaff in the WAVE2004

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<http://www2.nict.go.jp/dk/c216/>

To investigate the atmospheric gravity waves (AGWs) in MLT region, we conducted the WAVEs in airglow campaign in 2004 (WAVE2004) using a rocket-borne and ground-based instruments in Kagoshima, Japan. The S-310-33 rocket was launched from JAXA Uchinoura Space Center (USC, 31.25N, 131.08E) at 15:30 UT on 17 January, and observed atomic oxygen density, electron density, airglow intensities, and wind velocity. The wind velocity is measured by tracking foil chaff released from the rocket. In the same night, we also carried out ground-based observations using all-sky airglow imagers at Yamagawa Radio Observatory of NICT (31.20N, 130.62E) and Sata Observatory of STEL (31.0N, 130.7E), and a sodium lidar at Yamagawa.

From observational results, we derived several AGWs propagating in the MLT region. The most conspicuous AGW with a period of 2 hours is shown in Figure 1. In this figure, downward propagating wave structures appear between 85 and 105 km altitude. Amplitude of a sodium density fluctuation is about 15 %. At the same time, wave-like structures with the same (2 hours) period appeared in all-sky images of OI 557.7-nm emission. A horizontal wavelength, phase velocity, and propagating direction were 575 km, 115 m/s, and east-northeast, respectively. This is the first case that vertical and horizontal structures of the AGW propagating in the MLT region are obtained simultaneously. We will present detailed analysis results of this experiment. We will also discuss about the source of the AGW.

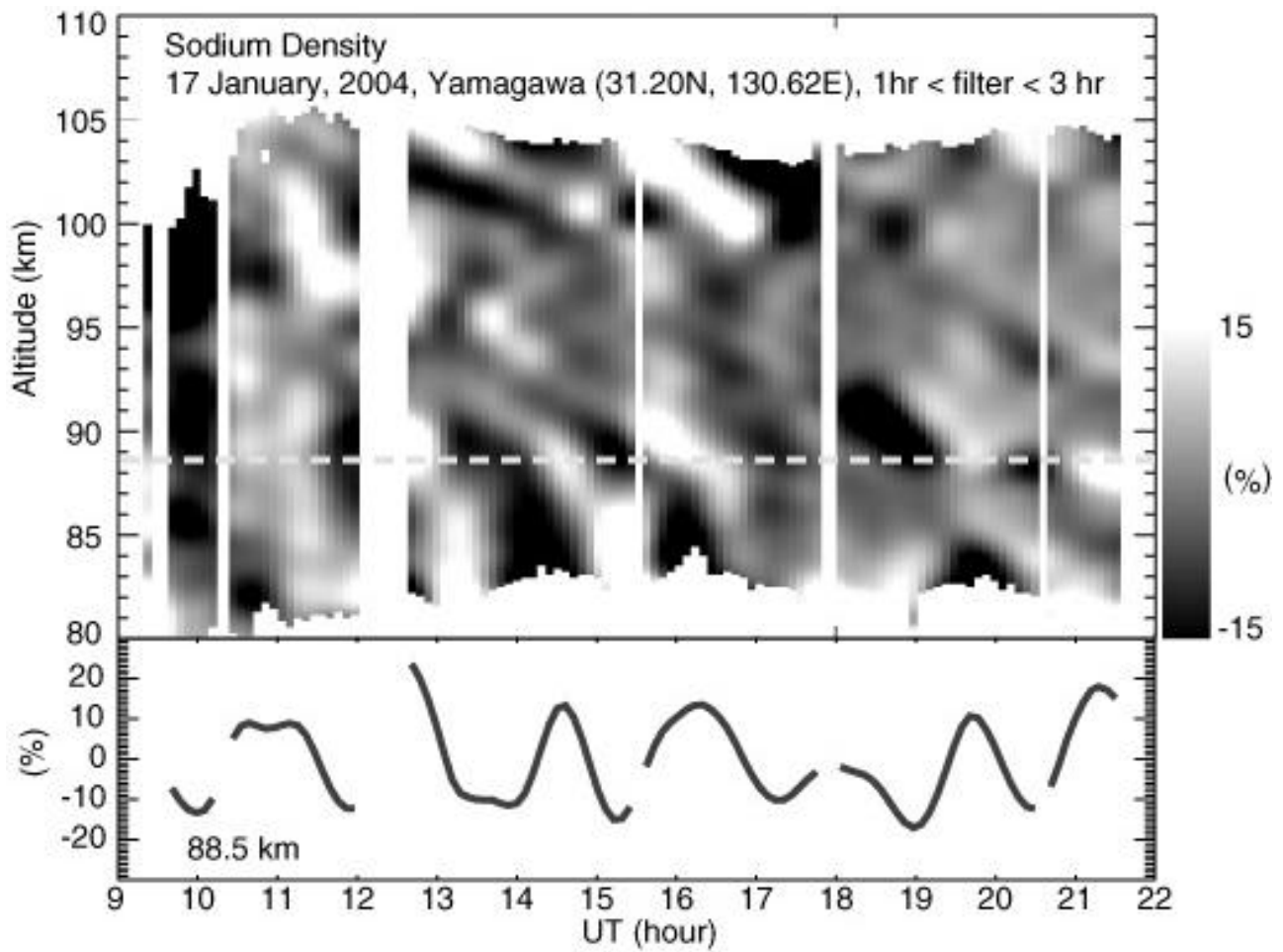


図1 山川で観測されたナトリウム原子密度の時間高度断面（上段）と高度88.5キロメートルでのナトリウム原子密度の時間変動（下段）。時間軸方向に1-3時間のバンドパスフィルターをかけてある。