Category and Session number: OA8

Preferred Mode of Presentation: Oral

Layered Structures in the Equatorial Eastern Pacific

S. OTSUKA and S. YODEN

Department of Geophysics, Kyoto University, Kyoto, Japan

SHIOTANI et al. (2002) showed the results of GPS radiosonde and ozonesonde observations on board the research vessel "Shoyo-Maru" in the equatorial eastern Pacific, which observations took place in September and October 1999 as a part of the SOWER/Pacific mission. They frequently observed layered structures in ozone and humidity, which are highly anti-correlated (Fig. 1). These layers have vertical scales from several hundred meters to several kilometers. Horizontal scales of these layers are roughly 1000km, which may correspond to time scales of about 2days, since the vessel sailed about 500km/day. These layers are related to northerly winds, which bring in wet and ozone-poor air from the inter-tropical convergence zone situated in the northern side of the main cruise track.

We simulated the layered structures using a mesoscale numerical model MM5, which is provided by NCAR/PSU, USA. We calculated the region of tropical eastern Pacific (longitude: 62W~128W, latitude: 1S~20N) from September 26, 1999 to September 28 with an initial and a boundary conditions made from the NCEP final global analyses dataset. Layered structures similar to the observed ones are simulated in the equatorial eastern Pacific. Relative humidity and meridional wind component are anti-correlated in these layers (Fig. 2). Another simulation in the western Pacific showed a different vertical structure without such layered structures. Detailed analyses on the material transport associated with these layers using Lagrangian trajectories, passive scalar, and so on will be reported.

Keywords: tropical eastern Pacific; layered structures; moist convection; inter-tropical convergence zone; material transport.

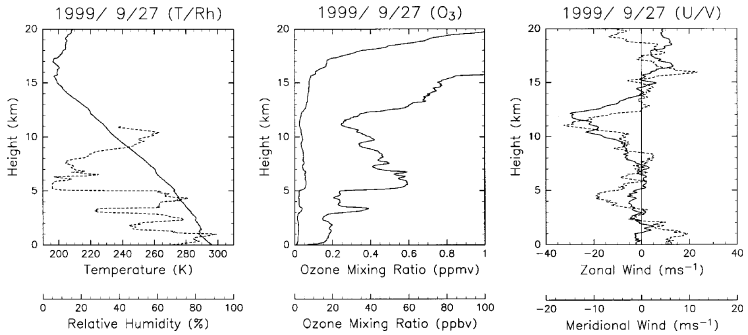

Figure 1: Observed vertical profiles (Shiotani et al. 2002).

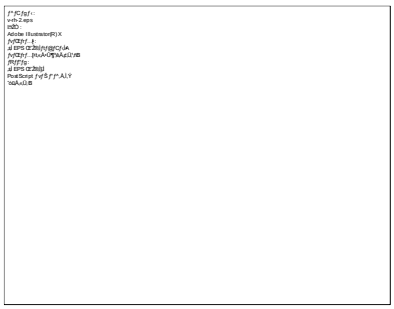

Figure 2: Vertical profiles of relative humidity(○) and meridional wind(●), simulated with the MM5 model.

Reference

[1] M. SHIOTANI et al, *J. Meteor. Soc. Japan*, **80**, 897 (2002).