

Daily Science Report
Stratus2007 Cruise
NOAA Ship Ronald H. Brown
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Summary of Recent Activities

The ship departed Panama as planned the morning of October 16. Observations were officially begun on October 18. The ship reached 16 S 77 W by the end of October 21 (Fig. 1). The ESRL observations include air-sea fluxes/near-surface bulk meteorology, cloud ceilometers, radar wind profiler, scanning Doppler C-band precipitation radar, a microwave radiometer for column water vapor/liquid, and aerosols in the 0.1 to 6 micrometer range. Rawinsonde launches are currently every 6 hours until reaching the buoy location at 20 S 85 W when the frequency will increase to every 4 hours. A sample rawinsonde profile is shown in Fig. 3; a strong subsidence inversion typical of stratocumulus regions is visible at a height of about 800 m. This trace indicates a cloud free sky (note that temperature and dew point traces do not quite intersect), which happened to occur in early afternoon. Fig. 3 is a photograph taken at the same time as the sounding. Another interesting feature is the very strong wind shear at the inversion. The cloud ceilometer return for the day is shown in Fig. 4; a brief clear period is visible near the end of the day. At the end of this day cloud base has risen to about 700 m. The net heat flux into the ocean is about 110 W/m² (Fig. 5).

Data from the aerosol system are shown in Fig. 6. In this case we show data from the harbor in Charleston (JDs 279-283), the transect of the Gulf of Mexico and Caribbean (JDs 285-289), and the transect from the Gulf of Panama to 12 S (290-294). Note the lowest aerosol concentrations in the precipitation region of the Gulf of Panama and the highest in Charleston. Values off Peru (about 200/cm³) are typical of larger values usually found at the WHOI buoy site. So far, none of the very low values associated with pockets of open cells (POCs) have been observed. By the end of JD 294 a general trend appears in the transect south with the number of smaller particles increasing but the number of larger particles is decreasing (possibly because of the lower wind speeds the last few days).

Major activities include preparations for the DART/Tsunami buoy deployment and work on a report of findings in the Ecuador/Peru coastal region. Other activities include a launch of an ARGO profiling drifter buoy at 1700 and two surface drifter buoys at 1120 and 2340 GMT.

The ship will continue underway SSE for about another half day before reaching the SHOA tsunami buoy at 20 S 75 W (est. 1300 on 10/22/2007).

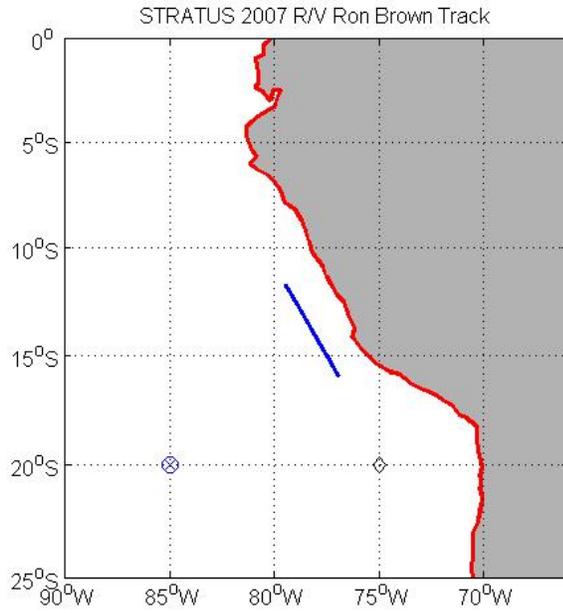


Figure 1. RHB cruise track on JD294 (Oct. 21). The diamond at 75 W is the SHOA tsunami buoy; the circle/plus at 85 W is the WHOI buoy.

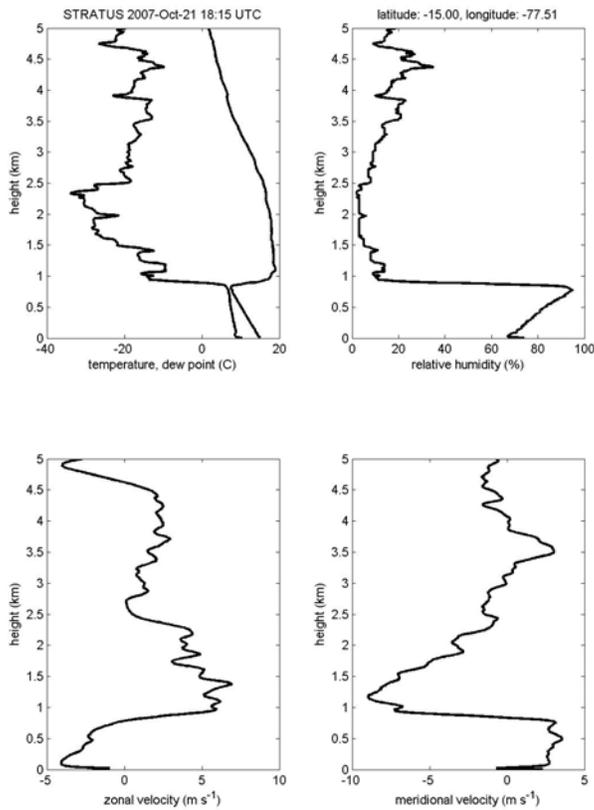


Figure 2. Rawinsonde profile 1800 GMT October 21.



Figure 3. Photograph of stratocumulus clouds 1800 GMT October 21 at 15 S 78 W.

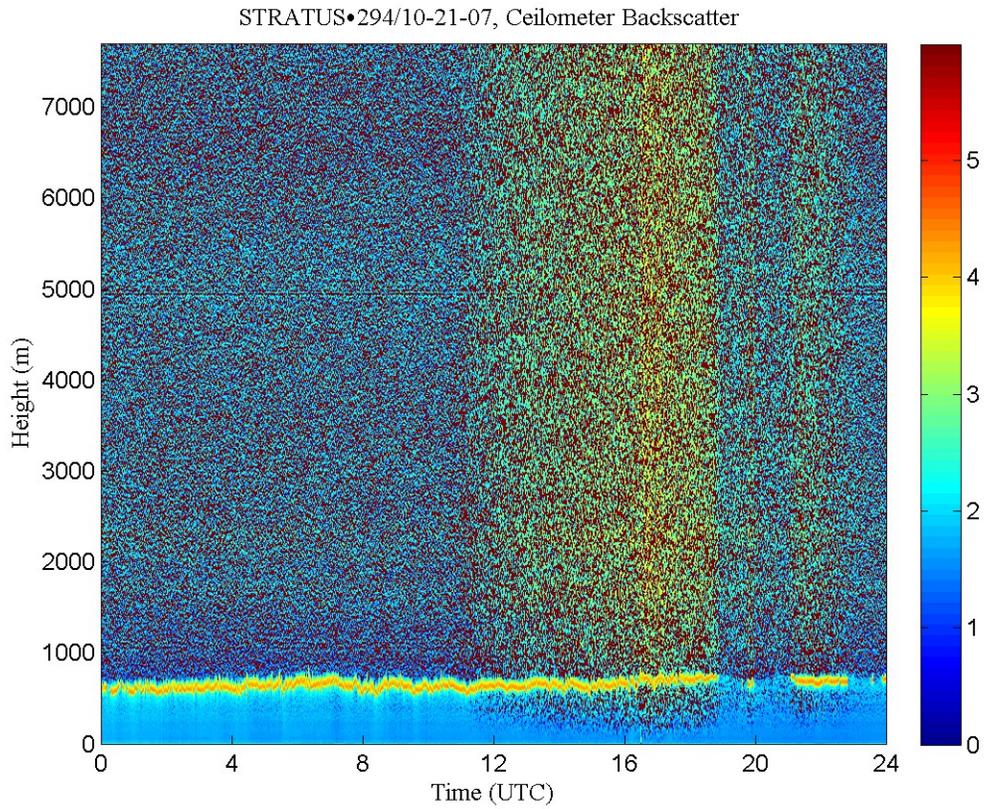


Figure 4. Time height cross section of ceilometer backscatter signal for October 21.

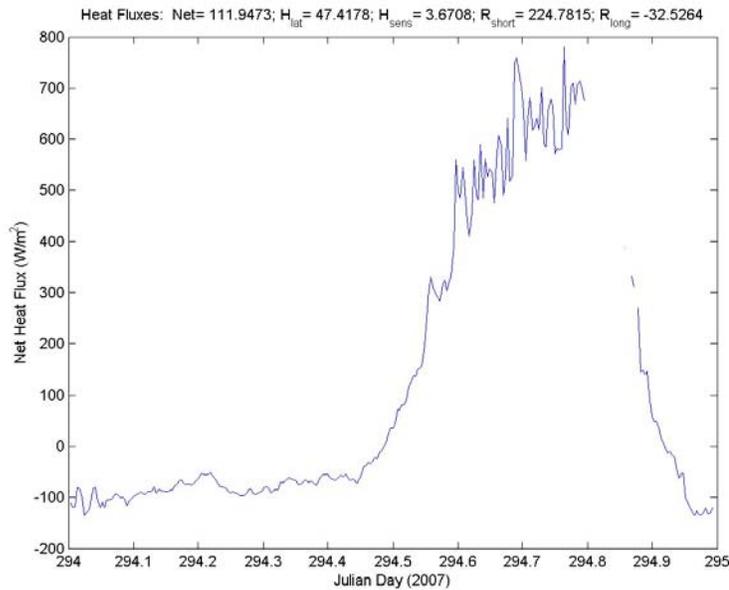


Figure 5. Time series of net heat flux into the ocean off Peru for October 21. The net heat flux is the sum of sensible (H_{sens}), Latent (H_{lat}) turbulent fluxes and net longwave (R_{long}) and net solar (R_{short}) radiative fluxes. Mean values for the day are given at the top of the graph.

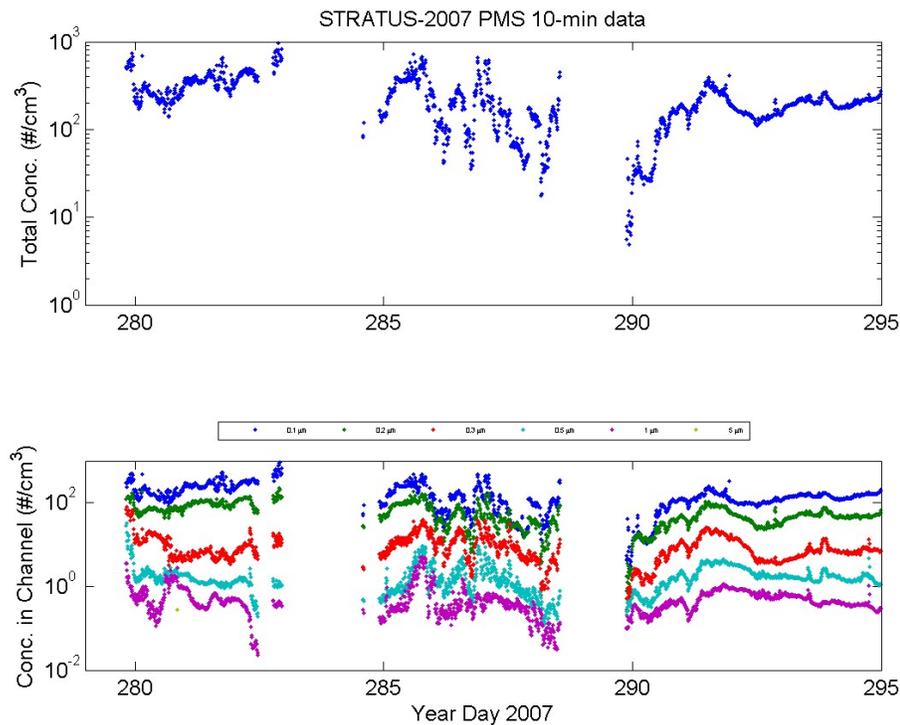


Figure 6. Time series of aerosol concentrations from Oct 6 through October 21. Upper panel: Total concentration for sizes from 0.1 to 5 micrometer. Lower panel: size resolved concentrations.