

Daily Science Report
Stratus2007 Cruise
NOAA Ship Ronald H. Brown
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Report #13 October 30, 2007

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 20 S 75 W by the end of October 22 and spent almost two days at that location before departing to the west on October 24 and arriving at the WHOI buoy at 20 S 85 W on about 1200 GMT October 26 (Fig. 1). We will depart this location 1200 GMT October 31. 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 being made every 4 hours (since arriving at the WHOI buoy). A sample rawinsonde profile taken at mid-afternoon local (1200 GMT) is shown in Fig. 2. A strong subsidence inversion typical of stratocumulus regions is visible at a height of about 1600 m. Fig. 3 is a photograph taken at 1800 GMT when it was almost completely clear; the clear period lasted about 5 hours.

The cloud ceilometer cloudbase height for the last five days is shown in Fig. 4; this figure shows an apparent diurnal cycle in cloud base height although much of the lower cloud base heights are associated with scud clouds and drizzling systems. POC periods are apparent as periods of streaks of drizzle and scud clouds. In Fig. 5 we show the time height cross section of backscatter intensity from the wind profiler which gives cloud top (inversion) height with cloud base from the ceilometer. The clouds were unusually thick for the first 16 hours of the day, then abruptly cleared at 1700. In Fig. 6 we show the data from the aerosol system for the period from October 22 through October 30. The passage of a small POC is apparent as the W-shaped feature in the aerosol concentration on JD 301 and another on JD302. In both cases it looks like the depletion of aerosols was a maximum at the leading and following edge of the POC. The clear period on October 30 does not appear to be associated with a POC.

On this day we deployed for the first time the pitch/roll stabilizing system developed by Sergio Pezoa at PSD. This platform is intended as a stable surface for improved IR and solar radiometer measurements. Both types of sensors are subject to errors when tilted relative to the vertical. The system uses a dual gimballed platform with servo motors that are driven by a computer connected to a pitch/roll sensor on the platform (Figs 7 and 8).

Major oceanographic activities centered on data transfers after the previous day's buoy operations and preparations for deployment of a Tsunami buoy tomorrow.

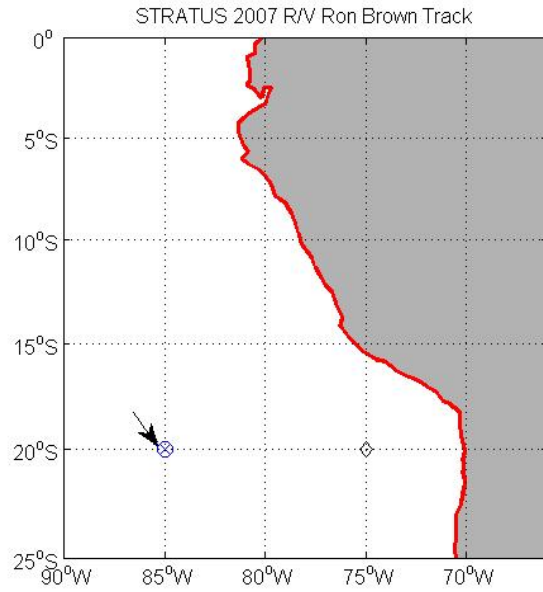


Figure 1. RHB cruise track on JD303 (Oct. 30). The diamond at 75 W is the SHOA tsunami buoy; the circle/plus at 85 W is the WHOI buoy.

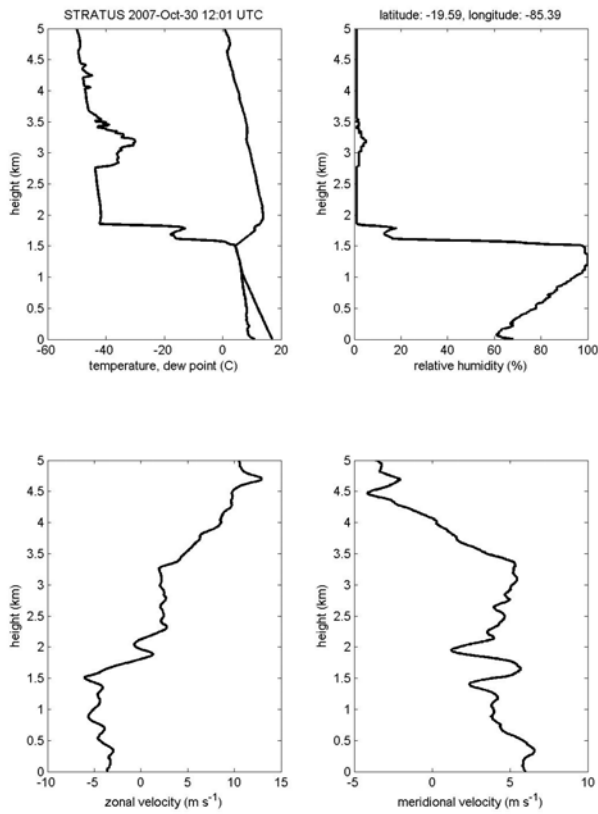


Figure 2. Rawinsonde profile 1200 GMT October 30.



Figure 3. Photograph of stratocumulus clouds 1800 GMT October 30 at 20 S 85 W.

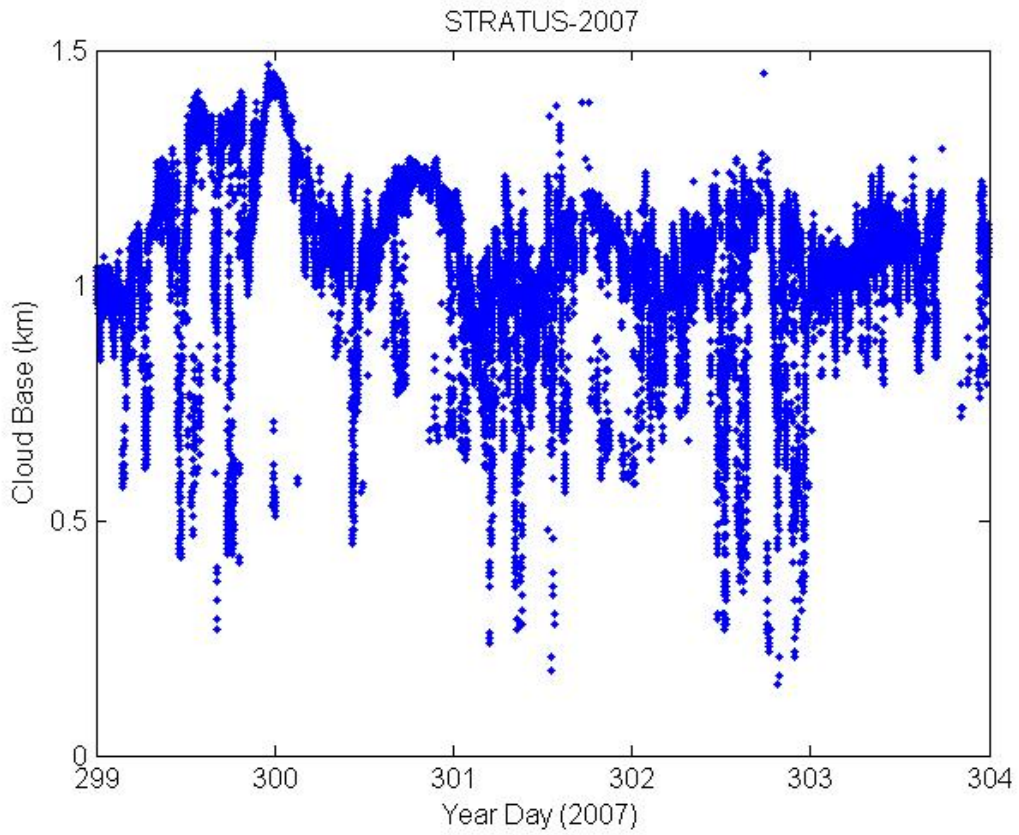


Figure 4. Time series of ceilometer cloudbase height from October 26 through October 29.

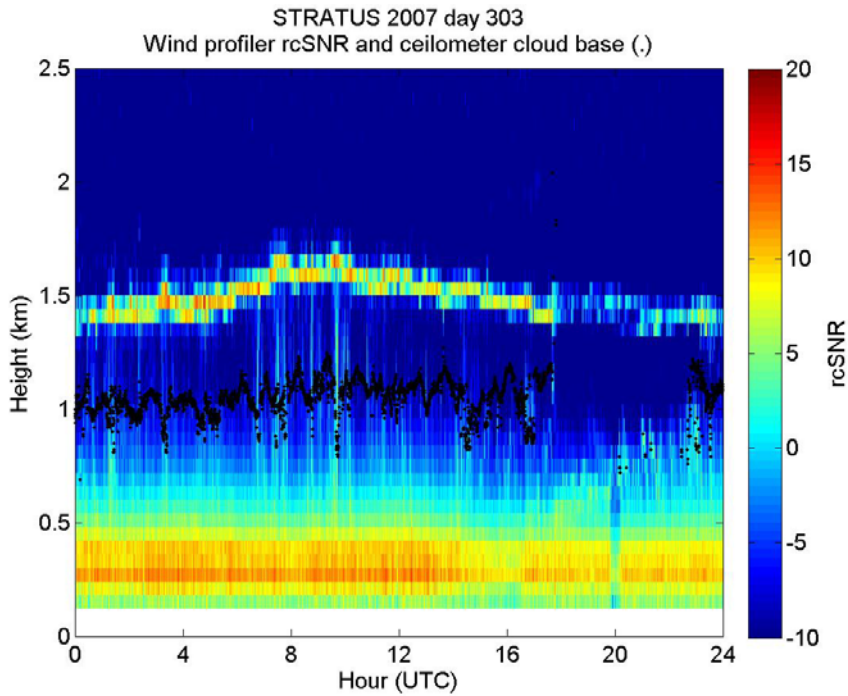


Figure 5. Time-height cross section of radar wind profiler backscatter intensity (color contours) with ceilometer cloud base heights (black dots) for October 30.

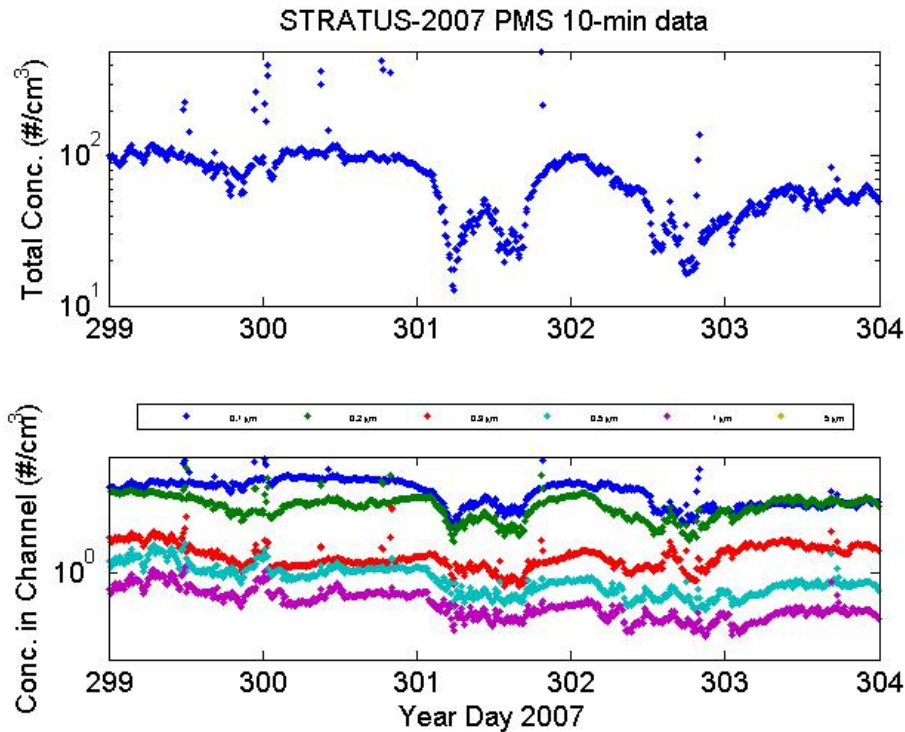


Figure 6. Time series of aerosol concentrations from October 26 through October 30. Upper panel: Total concentration for sizes from 0.1 to 5 micrometer. Lower panel: size resolved concentrations.



Figure 7. Photograph of PSD pitch/roll stabilized platform for solar and IR radiometer sensors in operation on its first field deployment. The system is mounted on top of a seatainer. The roll of the ship is apparent as the tilt relative to the horizon. Note the platform remains aligned with the horizon. A Kipp&Zonen pyrgeometer is on the left and an pyranometer on the right. The goldish cube in the center is the pitch/roll sensor.

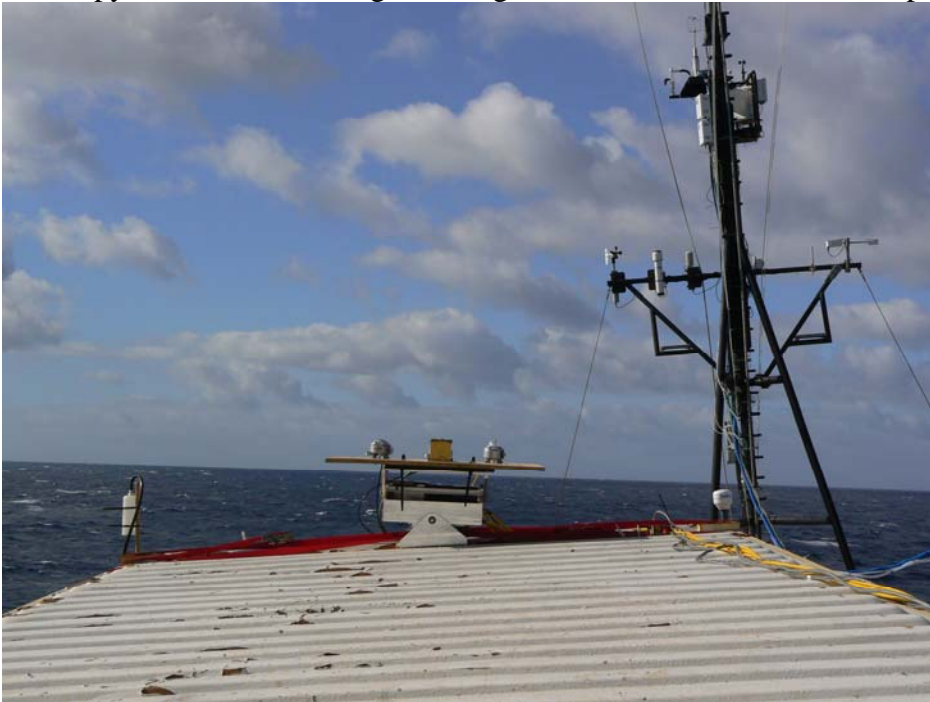


Figure 8. As in figure 8 but a different view.