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 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) where we will remain for 1 more day. 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 (1128 GMT) is shown in Fig. 1. A strong subsidence inversion typical of stratocumulus regions is visible at a height of about 1600 m; the relative humidity profile indicates a deep decoupled layer almost 0.5 km thick. The boundary layer is unusually humid for this location. Fig. 3 is a photograph taken at 1800 GMT. This photograph shows high thin clouds at the peak of afternoon warming.

A time height cross section of the ceilometer is shown in Fig. 4. The strong drizzle activity in the first half of the day is associated with the front boundary of a POC. The clear periods in the middle of the POC are visible later in the day. The cloud ceilometer cloudbase height for the last four days is shown in Fig. 5; 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. In this case the symbols in the graph represent the heights for cumulative distribution thresholds: 15%, 50% (median) and 85%. The 85% height (i.e., 85% of the cloudbases are lower than this height) is a good indicator of cloud bases not associated with scud clouds. In Fig. 6 we show the data from the aerosol system for the period from October 22 through October 29. 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.

Major oceanographic activities centered on buoy operations. The buoy was recovered in the morning and the rest of the day was spent cleaning the sensors (Fig. 7) and downloading the data. Another highlight was a quick look at the meteorology data obtained from the sensors on the DART/SHOA buoy a few days ago. A report on the 1-year time series is available on the VOCALS website: http://catalog.eol.ucar.edu/cgi-bin/stratus/report/index (operations report at 2208 October 30).

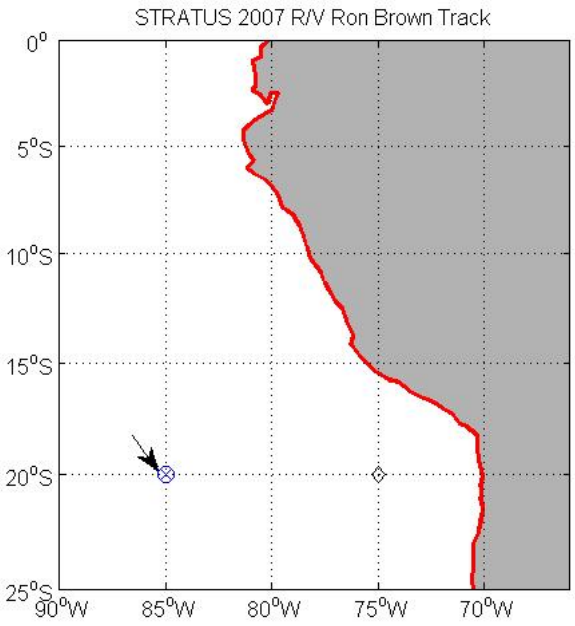

Figure 1. RHB cruise track on JD302 (Oct. 29). The diamond at 75 W is the SHOA tsunami buoy; the circle/plus at 85 W is the WHOI buoy.

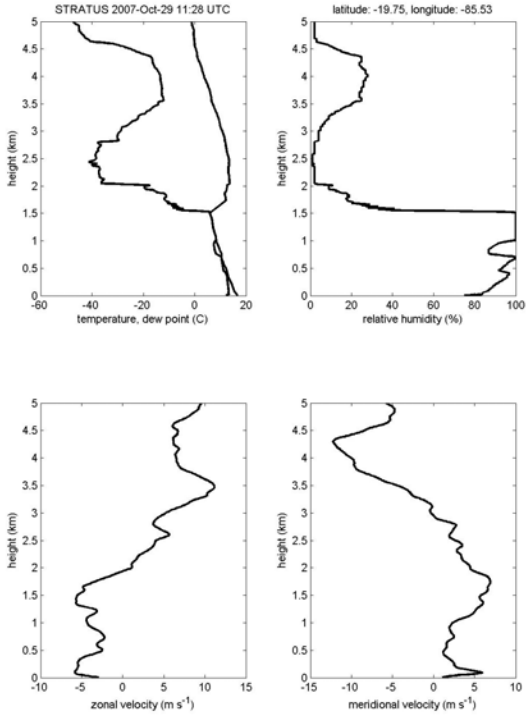

Figure 2. Rawinsonde profile 2000 GMT October 29.

Figure 3. Photograph of stratocumulus clouds 1800 GMT October 29 at 20 S 85 W.

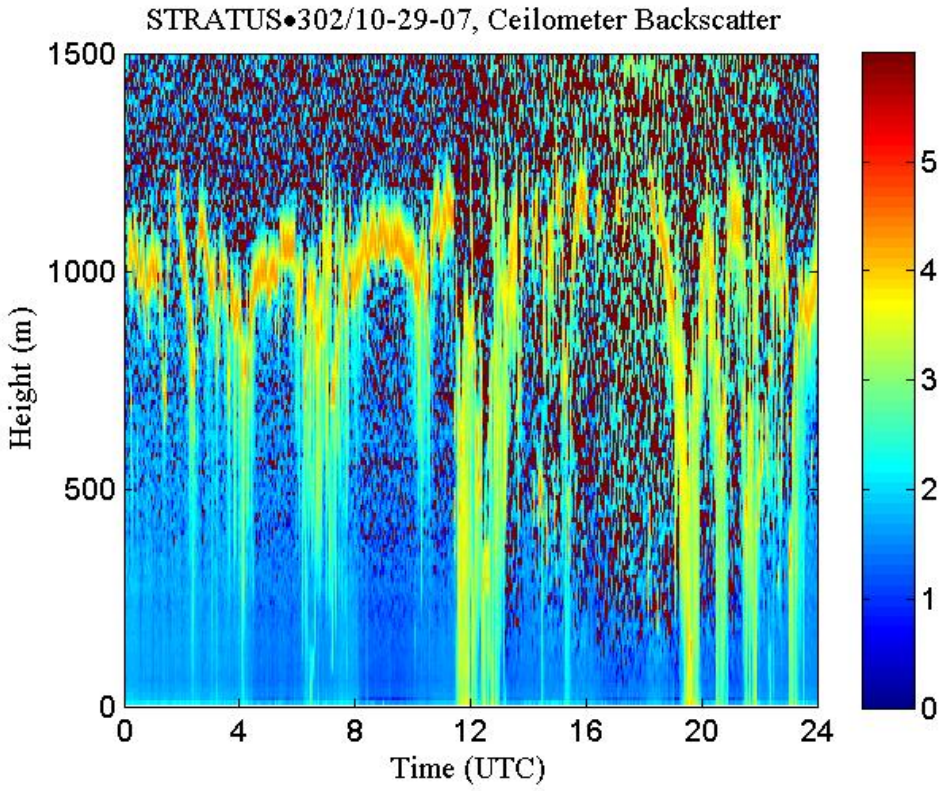

Figure 4. Time-height cross section of ceilometer backscatter intensity for October 29.

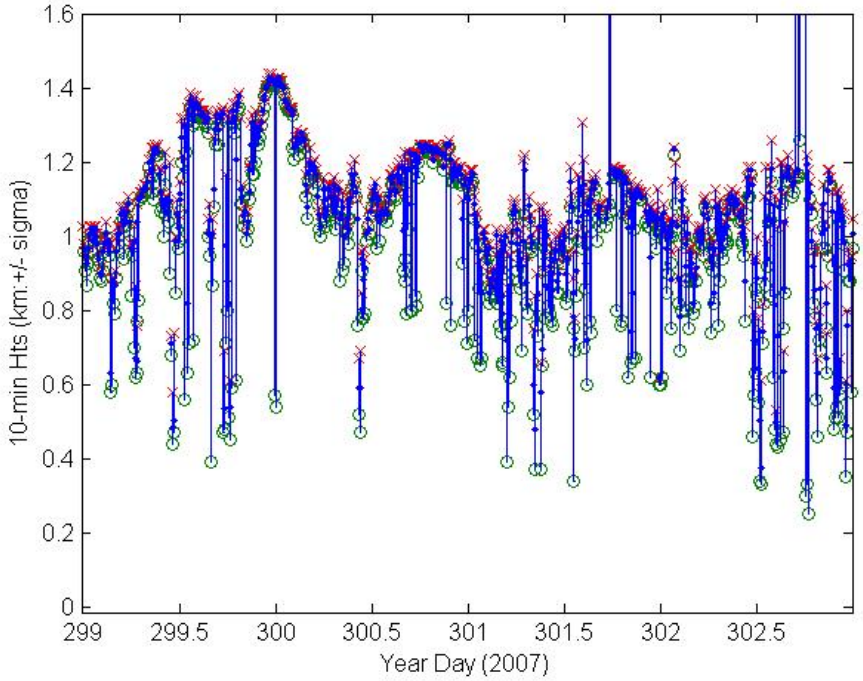

Figure 5. Time series of ceilometer cloudbase height from October 26 through October 29.

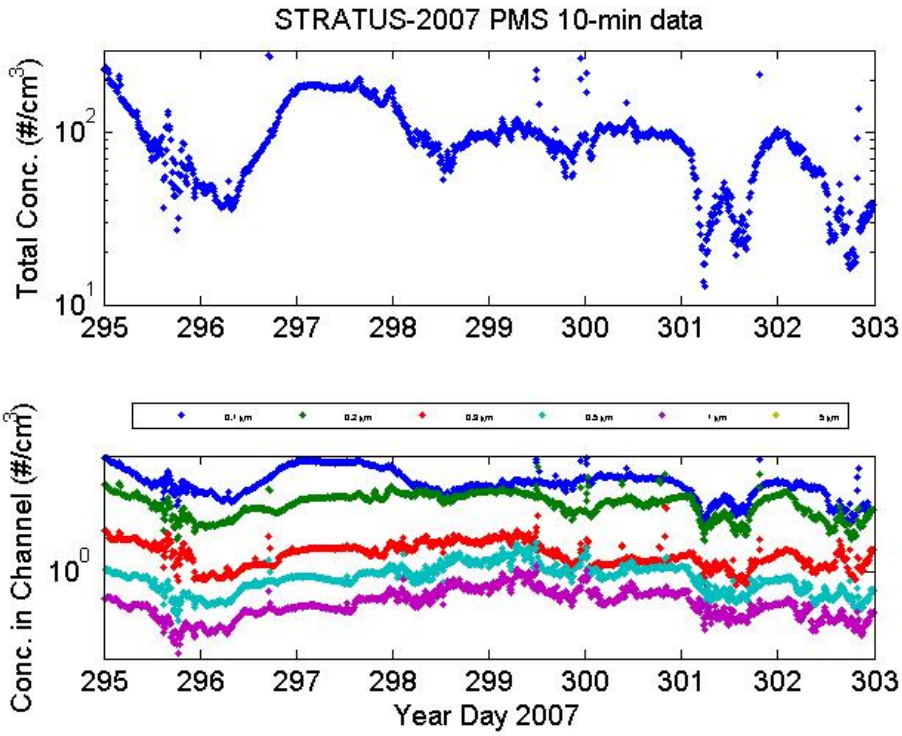

Figure 6. Time series of aerosol concentrations from October 22 through October 29. Upper panel: Total concentration for sizes from 0.1 to 5 micrometer. Lower panel: size resolved concentrations.

Figure 7. Photographs of old WHOI buoy instrument cleaning activities on October 29. Gooseneck barnacles are the principal biofouling species.