Daily Science Report
Stratus2007 Cruise
NOAA Ship Ronald H. Brown
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Report #11 October 28, 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) where we will remain for 5 days. 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 (2025 GMT) is shown in Fig. 2. A strong subsidence inversion typical of stratocumulus regions is visible at a height of about 1300 m; the relative humidity profile indicates a deep decoupled layer almost 0.5 km thick. 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 Fig. 6 we show the data from the aerosol system for the period from October 22 through October 28. The passage of a small POC is apparent as the W-shaped feature in the aerosol concentration on JD 301. In this case 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 day was spent next to the old buoy for about 24 hours of intercomparisons before extracting that system (Fig. 7). We will be in this area for the next four days. One interesting feasibility study done this week was plotting the current data from the ADCP in near realtime to see if eddy features are readily identified. This is an important aspect in the planning for VOCALS. Fig. 8 shows the results for the transect from 75 W to 85 W. In this case the signatures of two eddies can be seen in the currents.

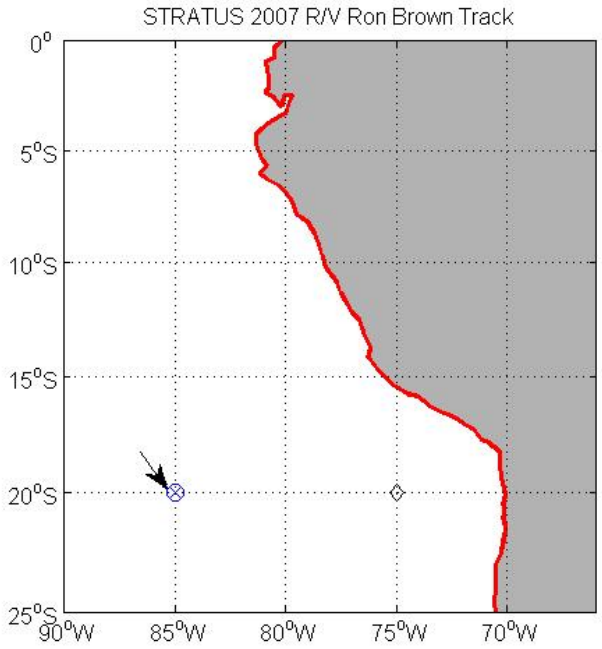

Figure 1. RHB cruise track on JD301 (Oct. 28). The diamond at 75 W is the SHOA tsunami buoy; the circle/plus at 85 W is the WHOI buoy.

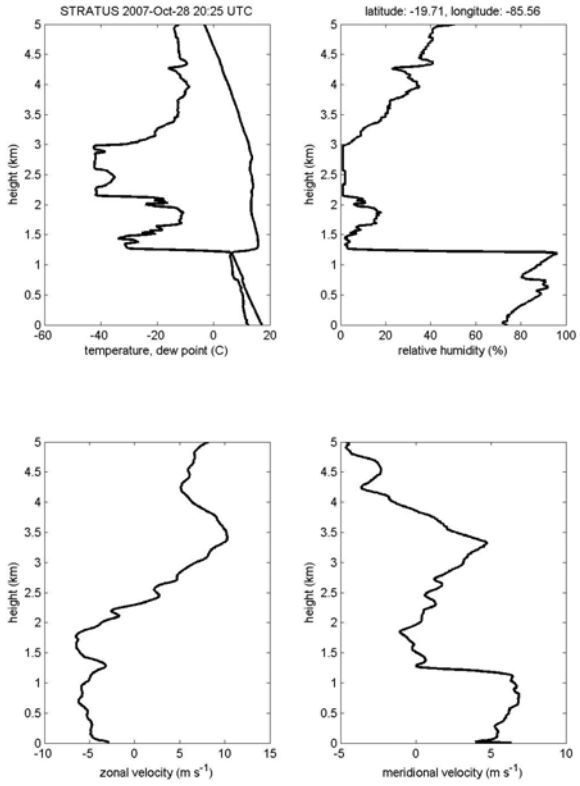

Figure 2. Rawinsonde profile 2000 GMT October 28.

Figure 3. Photograph of stratocumulus clouds 1800 GMT October 27 at 20 S 85 W.

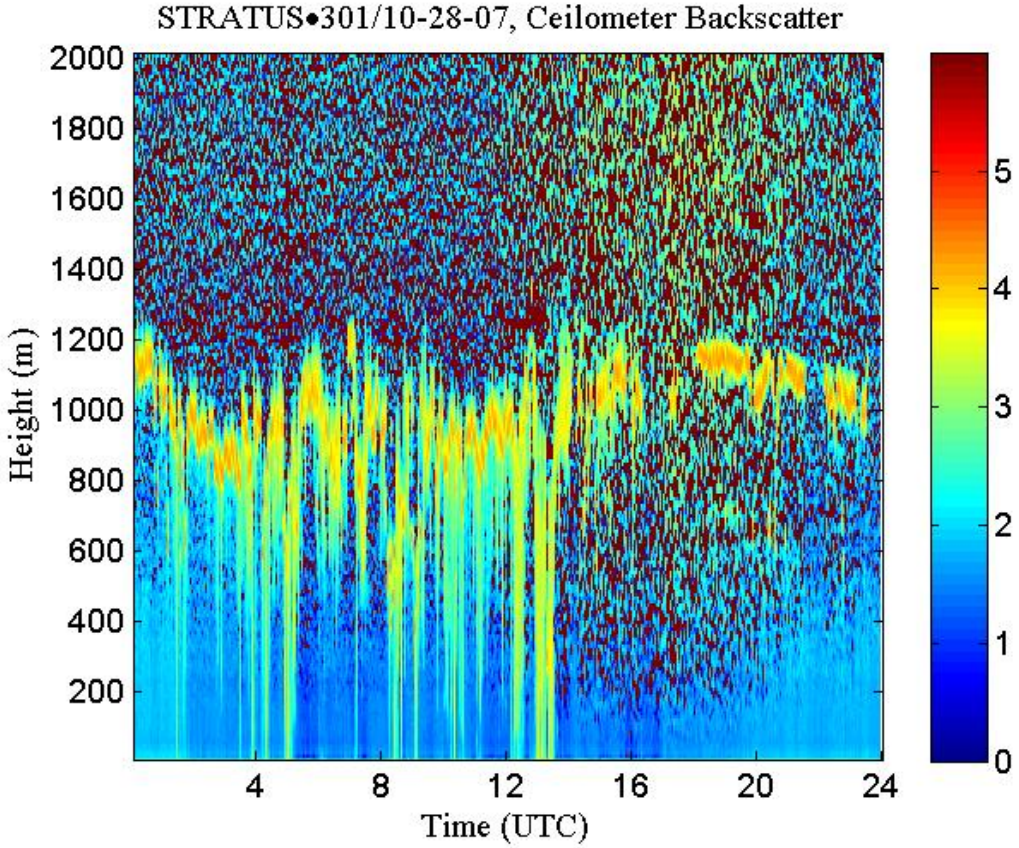

Figure 4. Time-height cross section of ceilometer backscatter intensity for October 28.

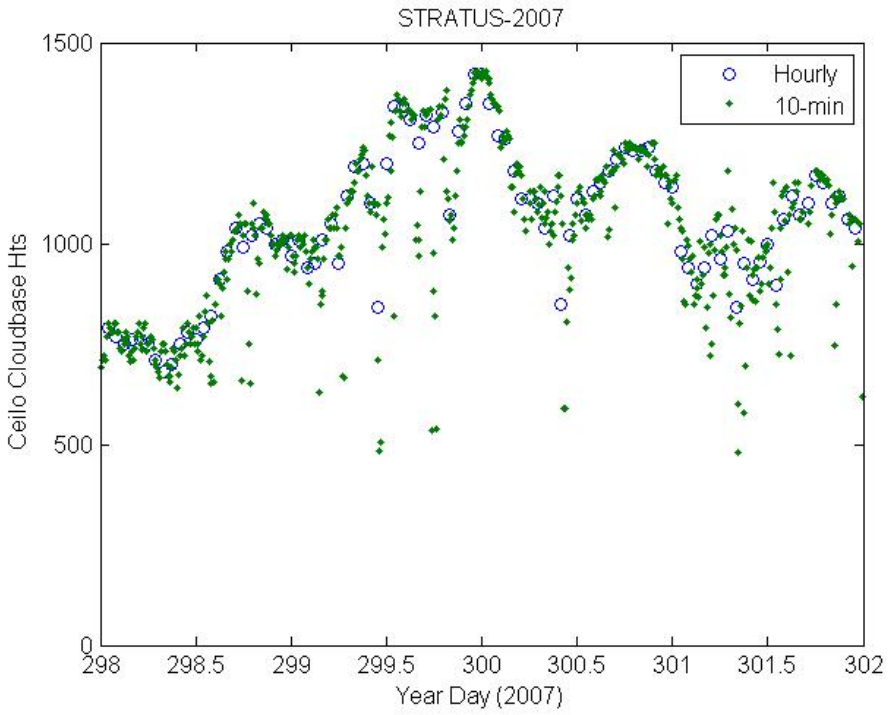

Figure 5. Time series of ceilometer cloudbase height from October 25 through October 28.

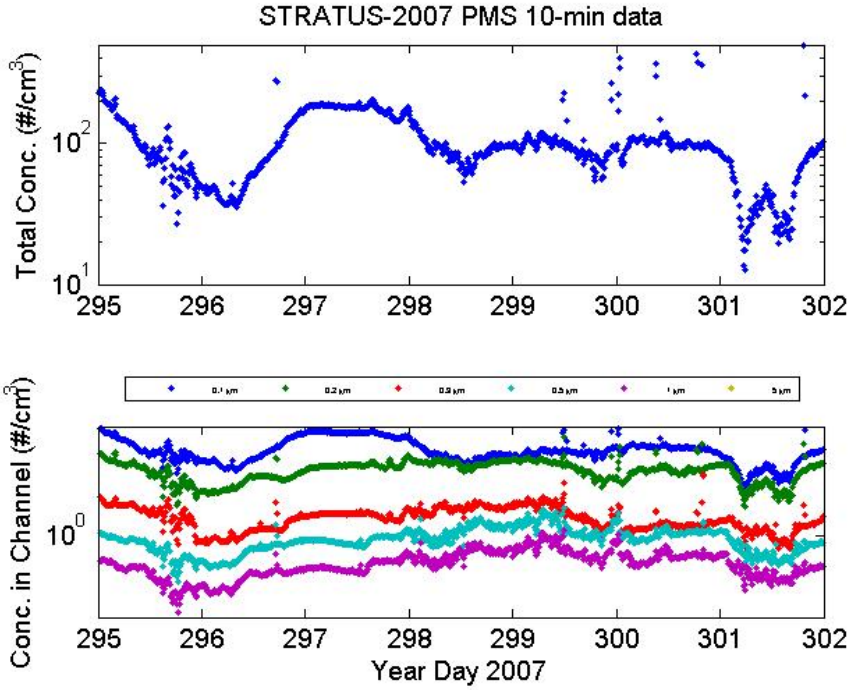

Figure 6. Time series of aerosol concentrations from October 22 through October 27. Upper panel: Total concentration for sizes from 0.1 to 5 micrometer. Lower panel: size resolved concentrations.

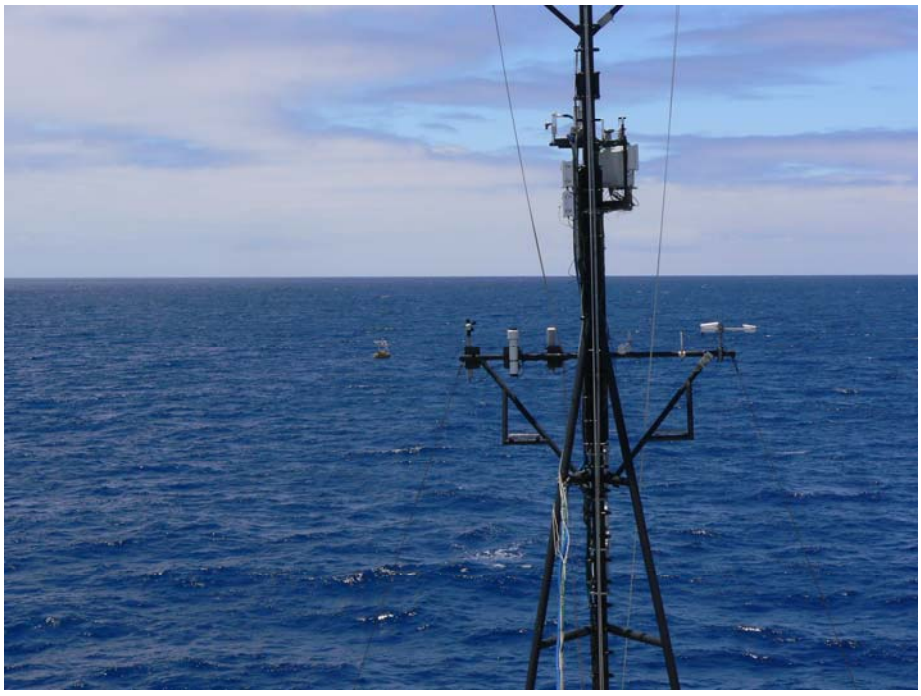

Figure 7. Photograph of old WHOI buoy during intercomparison period on October 28.

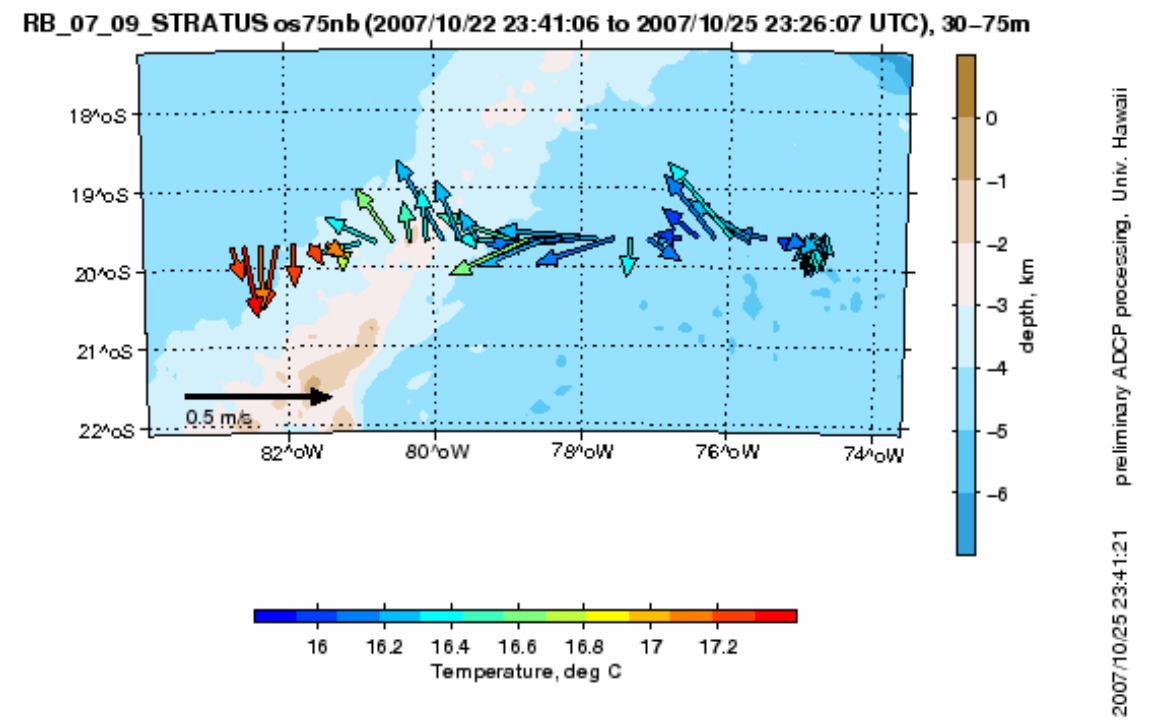

Figure 8. Near-surface currents from ADCP profiles measured on the transect from 75 W to 85 W. Length of arrow denotes current magnitude. Colors are ocean temperature.