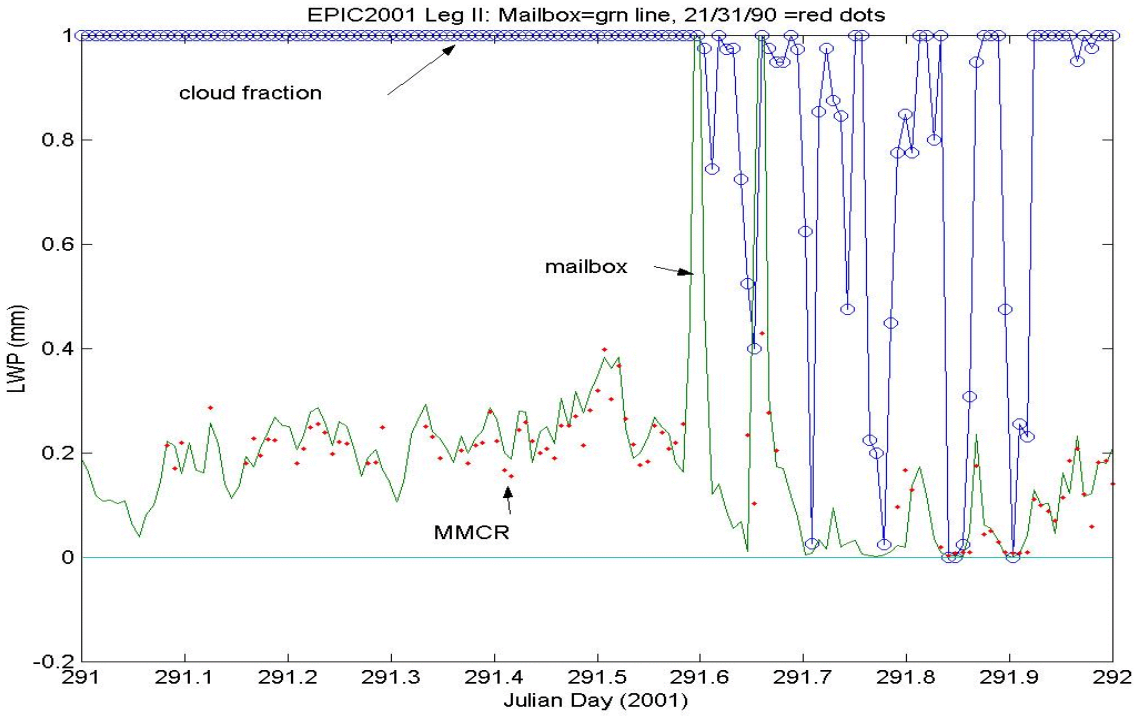
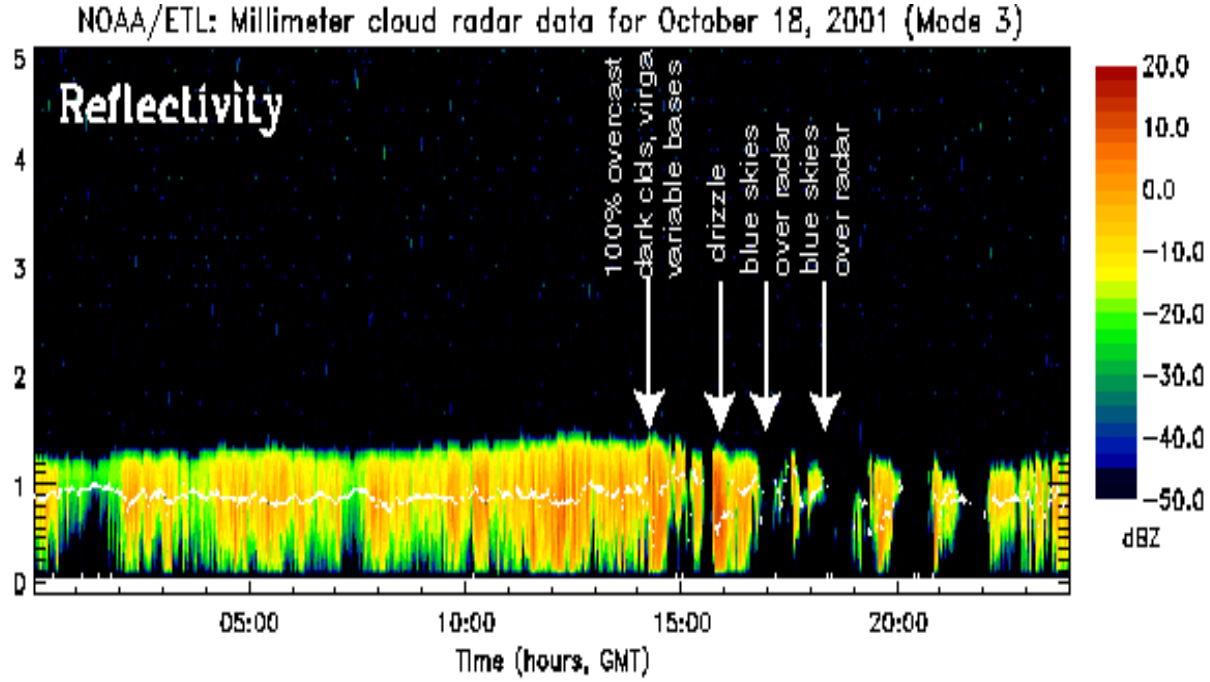
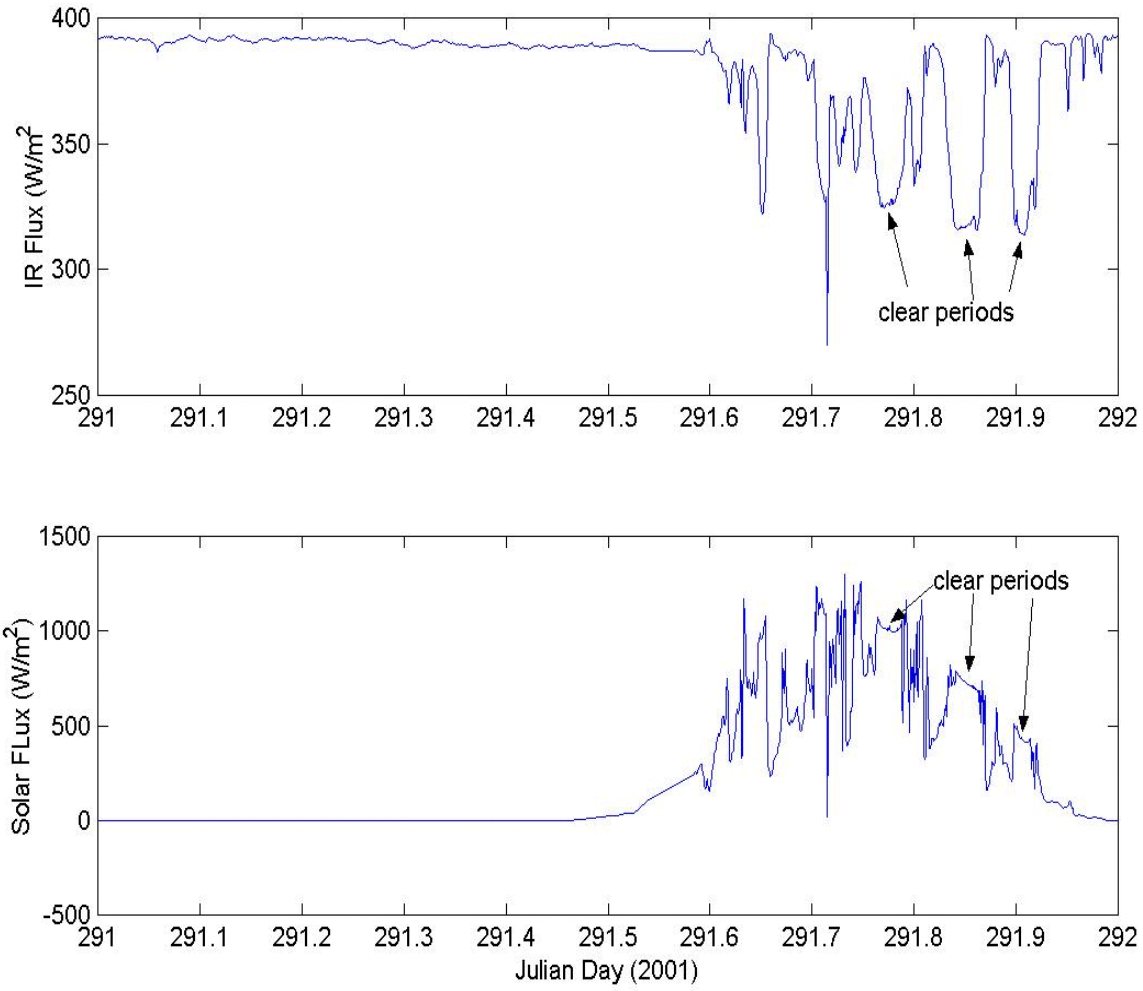


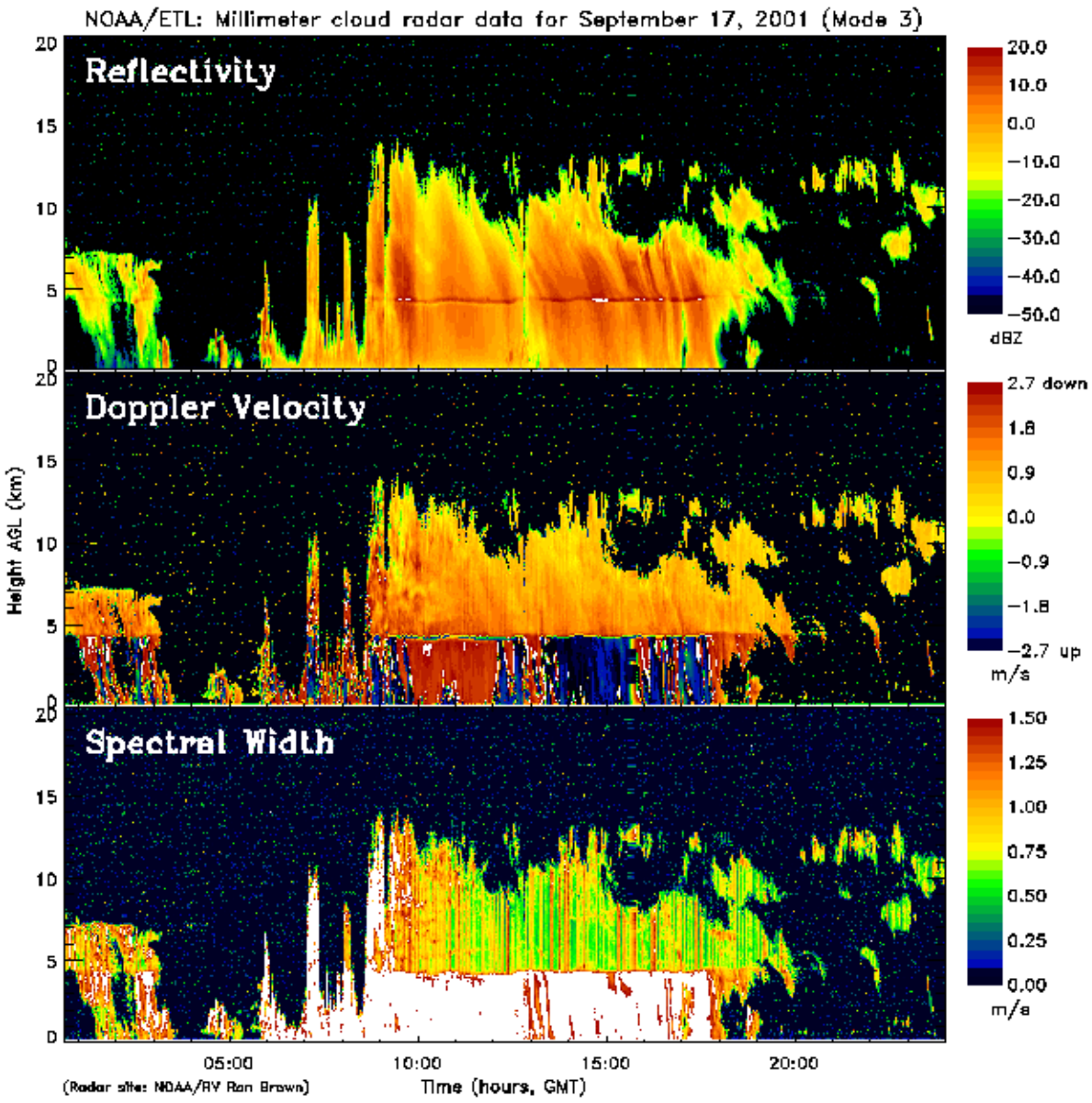


Stratocumulus cloud characteristics on Oct. 18, 2001. Upper panel: total liquid water path (LWP) from two microwave radiometers (green line and red dots) and cloud fraction from a ceilometer (blue circles). Lower panel: cloud radar backscatter intensity (color contours) and ceilometer cloud base heights (white dots). Daytime clearing was triggered (?) by 2 short drizzle events.

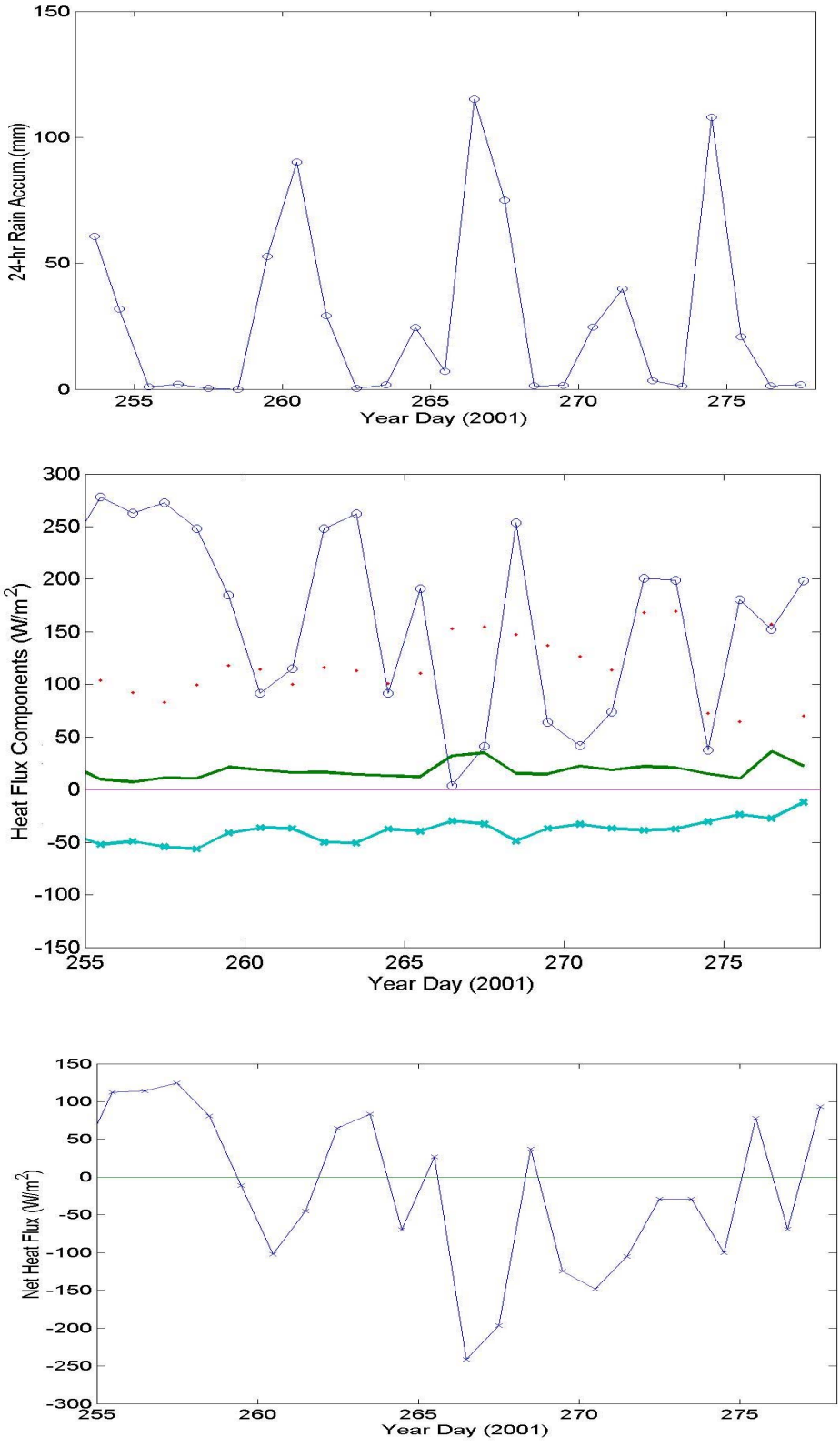


Downward radiative fluxes (upper panel: IR; lower panel: solar) on Oct. 18, 2001. The difference in IR flux for clear vs cloudy conditions is about 70 W/m^2 (so-called maximum cloud radiative forcing). The spikes in solar flux that exceed the clear sky flux occur when the sun is unobscured and additional radiation is reflected from nearby clouds.

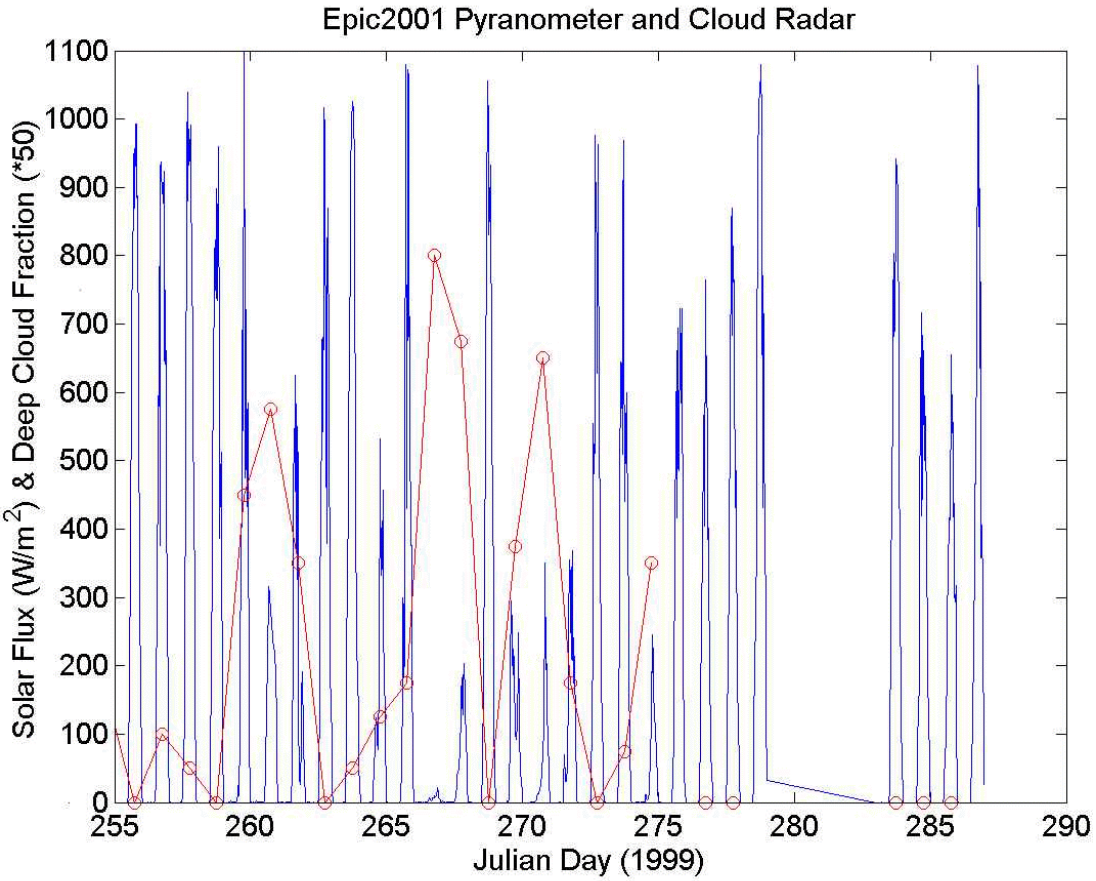
These two sets of figures above give an example of remote sensing of cloud properties from legII on EPIC2001. The liquid water path in the cloud is measured by microwave radiometer. From the cloud radar we can determine the droplet size as a function of height in the cloud. These can be related to microphysical/dynamical processes within the clouds. The radiative transfer properties are also related to the microphysical properties: the bulk transfer properties (i.e., fluxes emerging from cloud base) are measured at the surface. Daytime clearing was observed almost every day in the stratocumulus region even though the clouds were often 300-400 m thick at night. The diurnal cycle was much stronger that is typical off California (beyond the coastal influence). Because of this clearing, the net heat flux to the ocean averaged about 80 W/m^2 [in contrast to a net *cooling* of 30 W/m^2 observed at 10 N on legI]. In this case the clouds are having a smaller than expected effect on the surface heat budget of the ocean.



Time-height cross section from the 35 Hhz cloud radar for September 17, 2001 (Day 260) showing a period of deep convection. Upper panel shows the backscatter intensity (calibrated). The melting layer is apparent as the bright band at about 4.5 km. Middle panel is the mean Doppler shift of the return showing the fall velocity of the particles combined with the air motion.



ITCZ time series of daily-averaged rainfall (upper), flux components (middle), net heat flux to the ocean (bottom panel). The flux components are net solar (blue circles); net IR (cyan); sensible heat (green) and latent heat (red dots).



Time series of downward solar flux (blue line) and local deep convective index from the cloud radar (red circles) showing the strong correlation of deep convection and reduction of the solar flux at the surface. Day 266 had a 24-hr average solar flux of 3.8 W/m^2, the lowest (by a factor of 3) this research group has ever observed in 18 tropical cruises.