

Monterey Experiment Summary

The stated purpose of this experiment (for MISR) was to examine variations in marine stratus cloud structure and their effect on the scattered radiances and MISR retrievals of cloud albedo. The plan was to get coordinated measurements from (1) a ground site equipped with radar, lidar, radiosonde, broadband solar and passive microwave radiometers, (2) the CIRPAS twin Otter equipped to make in situ measurements of the cloud drop size distribution, (3) the DOE twin Otter with airborne cloud radar and upwelling spectral measurements (near cloud top) and (4) the ER-2 with AirMISR and the MODIS airborne simulator.

Unfortunately, this data set was not obtained because of a combination of winds at Dryden (base of operations for the ER-2) and brief failures of other equipment.

On the positive side, two ER-2 flights were accomplished. The first on June 29 (which is described in more detail in this document) was designed to gather a clear sky (i.e. aerosol data set) over a dark water surface. The second flight on June 30, was coordinated with the overpass of the UARS satellite above a cloudy region well off shore.

Both flights contain some AirMISR acquisitions above cloud targets. Although these acquisitions lack supporting in situ and ground based measurements, they do have coordinated airborne radar data.

Flight Summary:

June 29

	<u>Target/Heading</u>	<u>Supporting Measurements</u>	<u>Time</u>
Run 1	Dark Water – 10° 36° 42' N 122° 30' W	in situ aerosol measurements up and down spectral radiance & flux marine bouy data	17:31 - 17:43
Run 2	Dark Water – 100°	(same as above)	17:55 - 18:07
Run 3	Ground Site – 10° (on shore line)	MFRSR, CIMEL, Reagan radiosonde downwelling direct/diffuse broadband flux	18:17 - 18:29
Run 4	Ground Site – 280° 36° 42' N 121° 49.5' W	(same as above)	18:43 - 18:55
Run 5	Near shore cloudy region to the south of Monterey. (approx. 35° 27' N 121° W)	airborne radar up and down spectral radiance & flux	19:07 - 19:19

June 30

	<u>Target/Heading</u>	<u>Supporting Measurements</u>	<u>Time</u>
Run 1	Ground Site – 10° (on shore line)	MFRSR, CIMEL, Reagan radiosonde downwelling direct/diffuse broadband flux	22:04 - 22:16
Run 2	Off shore cloudy region	airborne radar up and down spectral radiance & flux	22:34 - 22:46
Run 3	Off shore cloudy region	airborne radar up and down spectral radiance flux	22:56 - 23:08
Run 4	Ground Site – 280°	(same as Run 1)	23:33 - 23:45
Run 5 ?	Random inland target	none	?

Observations from the Ground Site:

On June 30 it was clear clear clear all afternoon. A short pictorial summary of events on June 29 follows:



Figure 1 – Fog and patchy clouds lifted leaving clear skies at the radar site just before 18:00 UTC. (View looking south towards Monterey).



Figure 2 – Clear Skies lasted until about 18:15 UTC. (View looking east from shore over the ground site.) The drum in the lower right corner is the rawinsonde launcher. The MFRSR and a blue solar panel are just visible about a third of the way from the left edge of the picture. The large circular object (near the van) is a metallic waste treatment tank no longer in use. The radar, lidar, microwave radiometer and broadband solar radiometer are not visible (off to the right).



Figure 3 – Clouds were present in Monterey Bay and along the shore to the north side of the bay. Clouds in the bay slowly approached the radar site after 18:10 UTC, but never fully reached the radar site. After about 18:55 UTC the clouds receded with very clear skies returning later in the afternoon.

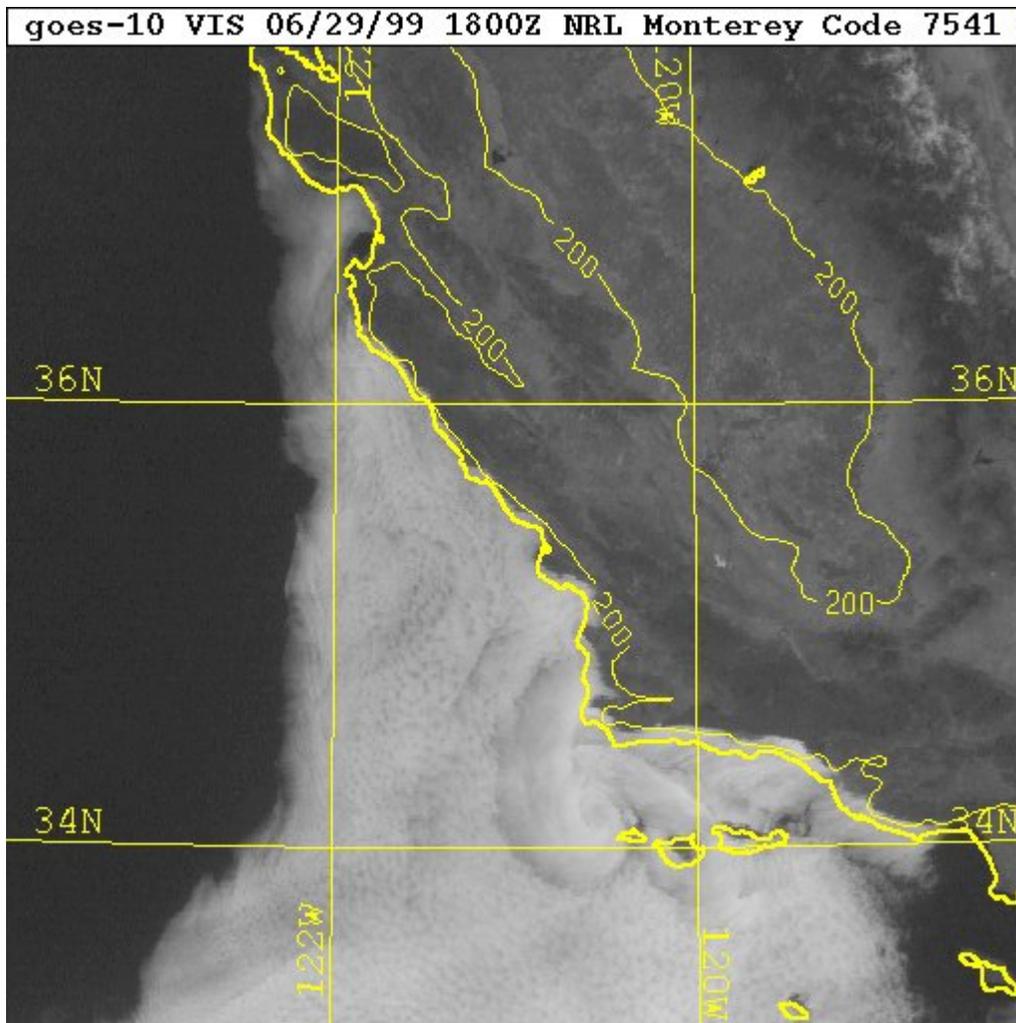


Figure 4 – On both June 29 and June 30 there was a “southerly surge” of stratus clouds. As in this case, southern surge events which stop at Monterey tend to fill the north side of the bay while leaving a clear pocket on the south side. (More typical southern surges push clouds further up to coast towards Point Reyes). A shallow boundary layer and off shore winds along the coast of Northern California help to create the large cloudless region north and west of Monterey.



Figure 5 - Between 18:15 UTC until sometime past 19:30 UTC tenuous cloud patches appeared to be torn off the tops of clouds in the south central portion of the bay and would then very quickly pass over the radar. These clouds were thin (1 maybe 2 radar bins, i.e. less than 120 meters thick) and seemed to have preferential top heights near 3.4 microseconds (~500 meters) but varied between 2.4 to as high as 5.9 microseconds (360 to 900 meters). Clouds at different altitudes appeared to be moving at greatly differing speeds.



Figure 6 – Even on the north side of the bay, the clouds dissipated quickly once reaching land. This figure shows the CIMEL sunphotometer. Just above the fence line (on the left) one can see clouds from the north side of the bay. (It is not apparent in this photo, but there appeared to me to be a (hydrated?) aerosol layer extending inland from the point where the clouds dissipated).



Figure 7- Picture of rotating a shadowband radiometer (RSR) and hills to the east of the radar site. The RSR measures direct and diffuse broadband shortwave irradiance. In this picture the shadowband is behind the radiometer casing.



Figure 8 – Picture of radiometric’s microwave radiometer (MWR) with an infrared thermometer (IRT) mounted on the top. In the distance to the right one of the water treatment tanks and clouds over the bay are visible.