Preliminary Squawk List for flight 1894,
Flown on Saturday, 1 December 2001,
IMPROVE II CV-580 flight 4.

Instruments not mentioned as having a problem are believed to have worked satisfactorily.

OVERALL LOOK-WEATHER

This flight occurred in a post-frontal situation with moist southwesterly flow in to above 500 mb. The flow was exceptionally strong with CV-580 winds on the ferry leg exceeding 120 kts thus greatly increasing the time required to arrive "on station." However, a co-pilot true airspeed measurement failure enroute terminated the flight as shortly after crossing into Oregon and we returned to PAE. Several remains of oceanic cumulonimbus complexes were sampled enroute to the turn around point and back again. They were nearly all quasi-stratiform and composed mainly of ice.

OVERALL LOOK-INSTRUMENTATION

Progress was made in solving two problems of the previous flight (1893). 1) The 1-D cloud probe seemed to indicate particles only in-cloud as it should on this flight. 2) The CPI worked much better than on previous flights. The cause of this improvement was apparently the reseating of two ITI graphics cards inside the computer by Don immediately after flight 1893 as per SPEC engineer Pat Marsely.

1. AIRCRAFT PARAMETERS

Rosemount and Shadin True Airspeeds: Erroneously high values onset about 1540 and continued through 1620 UTC impacting those temperatures and concentration measurements that are indexed by either TAS (e.g., Rosemount temperature, FSSP-100 concentrations, etc.)

2. STATE PARAMETERS

Rosemount static temperature (tstat): Numerous noise spikes are present in the data that affect from one to several seconds at a time. These must be excised from the data. Tstat tracked the tstatr values well and were very close though a difference (Rosemount lower than the tstatr by 1-3 C) has now been noted using the correction factors developed from the rawinsonde comparison. An investigation of this problem is underway.

Reverse Flow Temperature: Failed in-flight while on the return trip to PAE. The sensor is being examined by C. Black today Monday, 3 December. (Don Spurgeon remains ill.)

Cambridge chilled mirror dewpoint (dp): Heating and cooling cycles varied from non-existent to rather high amplitude covering as much as; the period of the cycles also varies with a range of more than 10˚ C. Normally the range is about 3-6˚ C. May be related to extremely dry conditions that has caused some sort of instability. Performance otherwise good. Average dewpoint values reasonable.

Rosemount analog pressure transducer (pstat): Continues to exhibit spurious changes in pressure of up to several mb in per second. These, in turn, can, cause spurious standard pressure altitude changes of up to 30-50 m in one second. Sensor may be wearing out. It has been acting this way since the SAFARI project. We are in contact with the Rosemount Engineering group about this problem. We have not yet received literature on their comparable digital sensors as of 11/26/01.

3. Cloud Microstructure Probes

DMT Hot wire device: Did not work, lots of noise spikes.

JW Hot wire device: Some “top hat” responses to clouds, but values spurious.

PMS 2-D cloud probe: Worked with the exception of occasional outages believed related to the extreme true airspeed on this flight. Tom rewrote the software to eliminate this problem which was that the probe would not image particles by default if the true airspeed was >125 m s-1. The probe had to be restarted after stopping by itself on occasion by “cycling” the power on and off.

PMS 1-D cloud probe: Worked but spectra are subject to some question though are not impossible. Peak concentrations, outside of Channel 1, are in the larger size channels thus raising some concern. Will continue to monitor for any degradation.

SPEC HVPS: Periodic outages noted followed by recovery without any intervention by us. Sometimes cycling the power was required to “wake” it up.

SPEC CPI: Worked much better than on the previous flight 1893, and this was probably related to a reseating of the two ITI graphics cards by Don after flight 1893 at the recommendation of SPEC.

4. AEROSOLS

Not QC-ed formally yet, but Tom has installed the CCN manufacturer's software that indicates via text in one of the CCN counter windows whether it needs liquid. He found yesterday that it ran out of liquid during the previous flight. Details to be added.