King Air B200 Flight Report

Aircraft :	LaRC B-200 King Air (N529NA) (Operating as NASA529)
Operating Site(s) From / To :	Yellowknife to Yellowknife (with CALIPSO track to the NW then fire operations near Uranium City)
Flight Date :	6/29/2008
Flight Number :	R-149
Take Off Time :	1241 Local (MDT), 1841 UTC
Landing Time :	1721 Local (CDT), 2321 UTC
Flight Time :	4.7 hours
Principal Investigator:	Rich Ferrare
Purpose of Flight :	Data [X] Ferry [ ] Functional Check [ ] Other [ ]
Sensor Payload :	HSRL, Digital Camera, and RSP
Comments :	Second ARCTAS II research flight launched from Yellowknife. CALIPSO track essentially entirely cloud covered. P-3 and DC-8 broke off track and headed to Lake Athabasca to work the fires there. The B200 followed DC-8 and sampled the Lake Athabasca fires. The P-3 opted to work radiation objectives over Great Slave Lake. ATC was again very accommodating. More detailed comments provided on the following pages

The B200 flight today was to be coordinated with the DC8 and P3. All three aircraft were to fly the CALIPSO track from N to S. The DC8 and P3 were to fly a coordinated comparison leg on that track. The B200 was to overfly the other aircraft, stop in Grande Prairie to refuel, and then fly to Lake Athabasca to sample the fires there on the return to Yellowknife. Just prior to joining up on the CALIPSO track, the P3 and DC8 cancelled their comparison flight on the CALIPSO leg. The P3 flew to the Great Slave Lake to meet some of their radiation objectives and the DC8 went to Lake Athabasca to sample the fire plumes. Due to these changes in plan, the B200 omitted most of the CALIPSO leg and redirected to Lake Athabasca to work the fires there in coordination with the DC-8. The B200 arrived after the DC8 spiral in the smoke plume, but had ~15-20 minutes of overlap with the DC-8 in the region.

On the first leg of the flight to the NW, optically thick ice cloud was observed below the B200 (top at ~6 km). Pilot reports indicated that the sky above the aircraft was free of cirrus for some parts of this leg, hence the observations may be useful for assessing the RSP cloud top retrievals and RSP-HSRL cloud retrievals.

Similar conditions were encountered on the CALIPSO run: skies were clear above the B200 (should be verified with CALIPSO observations) with ice cloud below. This should provide a good case to assess backscatter color ratio for ice cloud relevant to the transfer of CALIPSO calibration from 532 to 1064 nm as well as RSP cloud to retrievals, and RSP-HSRL retrievals.

At Lake Athabasca, the B200 crossed the fire plumes on the legs inbound and outbound from the region. Plumes were optically thick and pyroCB were observed by the pilots and in MODIS imagery. Aerosol was also observed aloft (5-6 km) that may have been smoke from fires in Siberia. No clouds were above the B200 while it was sampling the smoke plumes near Lake Athabasca, hence this should be a good data set for RSP.

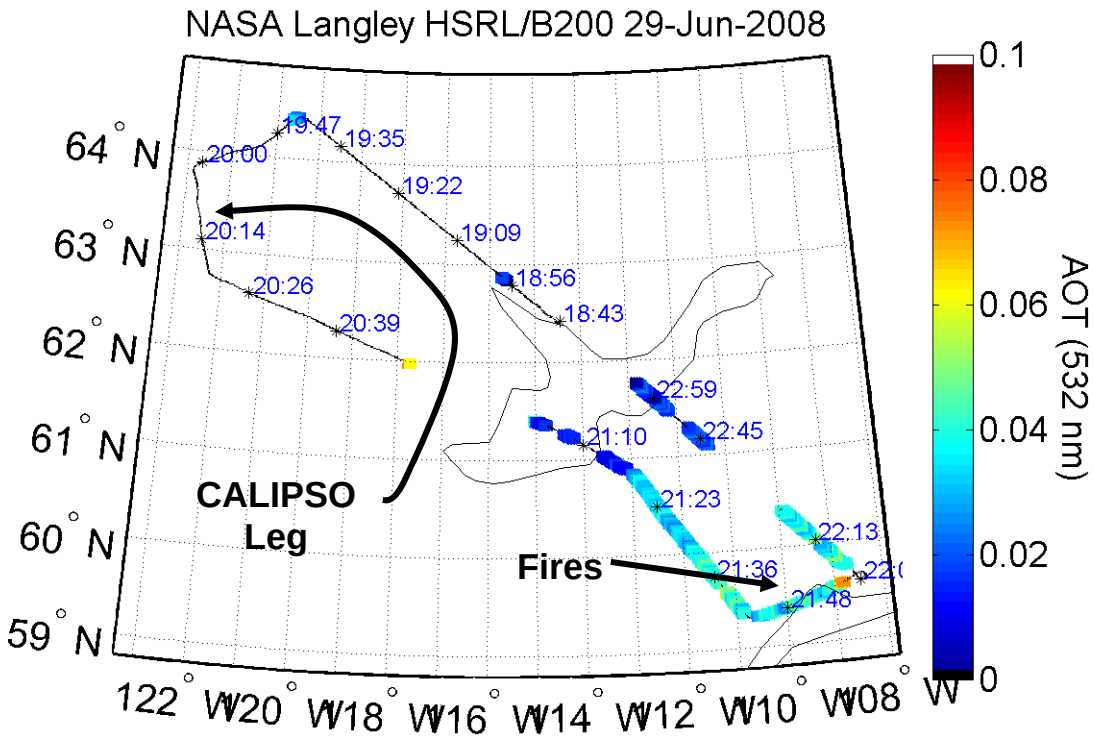

Figure 1. Flight track map color coded in aerosol optical thickness (AOT shown only for regions that were cloud free below the B200).

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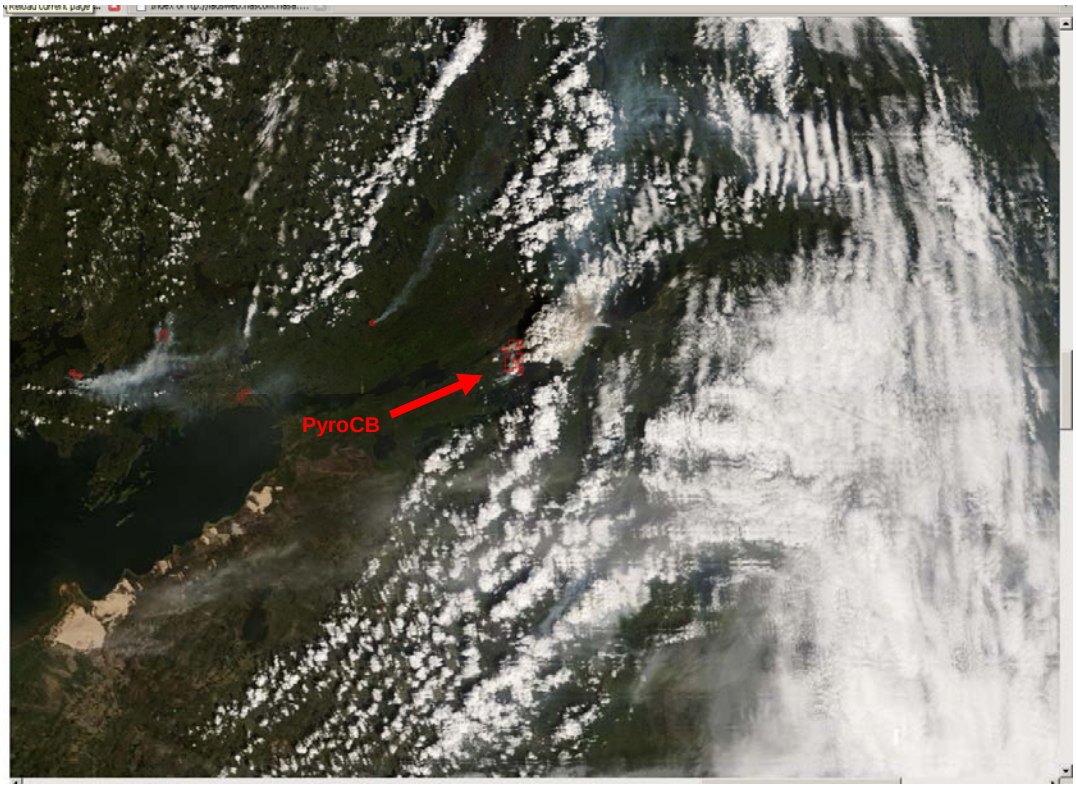

Figure 2. Imagery from MODIS showing some pyroCB (courtesy Chieko Kittaka)

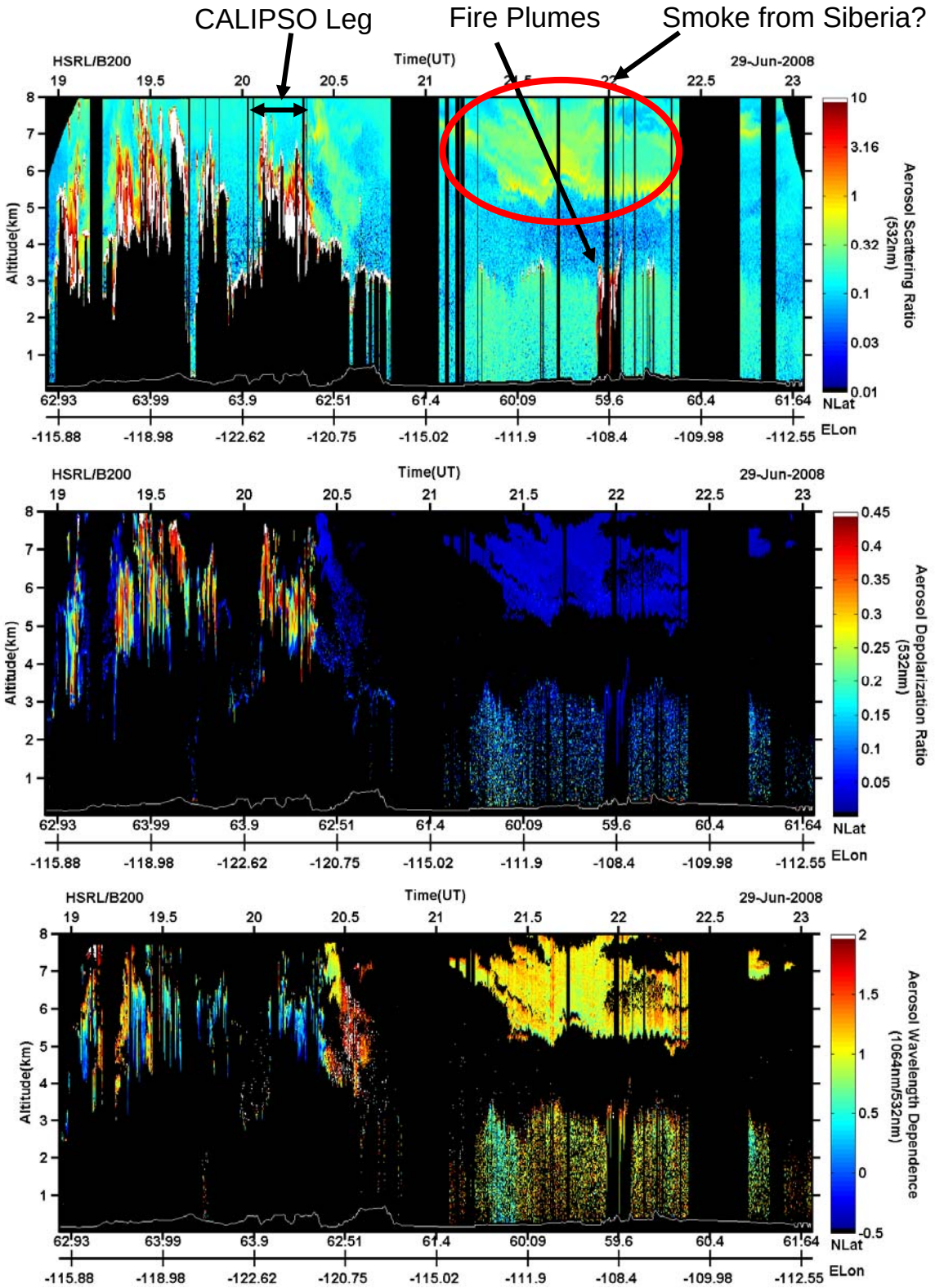

Figure 3. HSRL aerosol scattering ratio, depolarization ratio, and wavelength dependence. High wavelength dependence in lofted layer from 21 to 22.25 UT suggests small particles.