



DLR H₂O DIAL Measurements during IHOP Convective Initiation Missions

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Contents:

- **H₂O DIAL configuration**
- **Overview of CI mission flights**
 - **Preliminary results**
 - **Assessment of data quality**
- **Outlook**

H₂O DIAL system: IHOP configuration

- Nadir looking aboard the Falcon
- Transmitter output parameters:

Measurement quantity	Wavelength (nm)	Repetition (Hz)	Energy (mJ)	Availability
<i>H₂O mixing ratio</i>	<i>925 (on/off-line)</i>	<i>50 (on/off)</i>	<i>18</i>	<i>yes</i>
<i>Aerosol backscatter</i>	<i>925 (off-line)</i>	<i>50</i>	<i>18</i>	<i>yes</i>
	<i>1064*</i>	<i>100</i>	<i>50</i>	<i>yes</i>
	<i>532*</i>	<i>100</i>	<i>40</i>	<i>no</i>

** detection of s- and p-polarized backscatter*

Falcon's CI Mission Flights

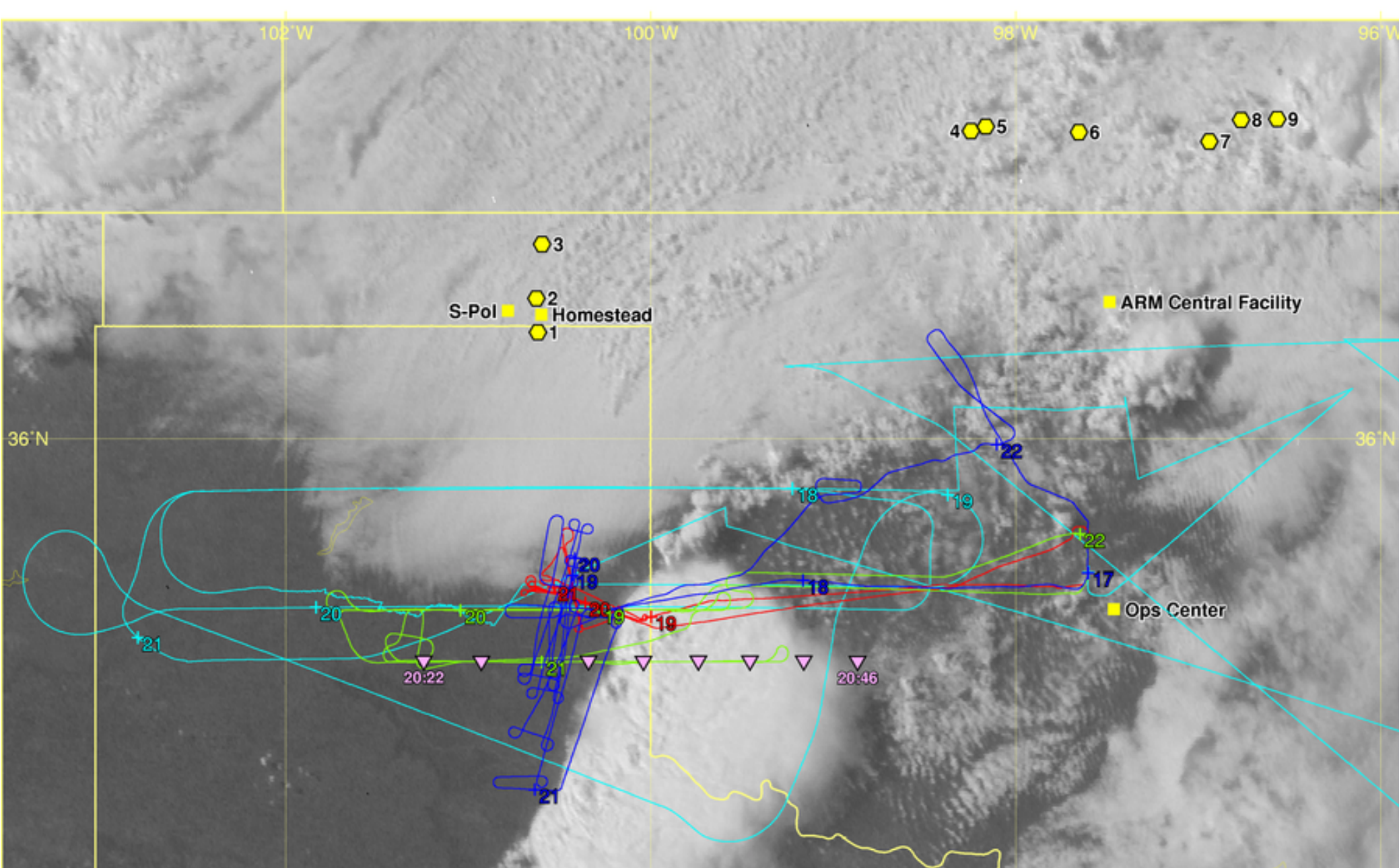
	<i>Flight time (UTC)</i>	<i>H₂O DIAL</i>	<i>HRDL</i>	<i>Dropsondes</i>
<i>24 May</i>	<i>18:28- 22:05</i>	<i>18:49- 21:50</i>	<i>down</i>	<i>none</i>
<i>3 June</i>	<i>18:30- 22:28</i>	<i>18:47- 22:13</i>	<i>partial coverage</i>	<i>7 drops 19:37-19:56</i>
<i>15 June</i>	<i>17:29- 21:00</i>	<i>17:40- 20:43</i>	<i>de- installed</i>	<i>none</i>

In-situ measurements along all flight tracks: p, T, humidity, wind

CI Mission 2002/05/24 1500-2300 UTC
GOES-8 1km visible 2002/05/24 21:25 UTC

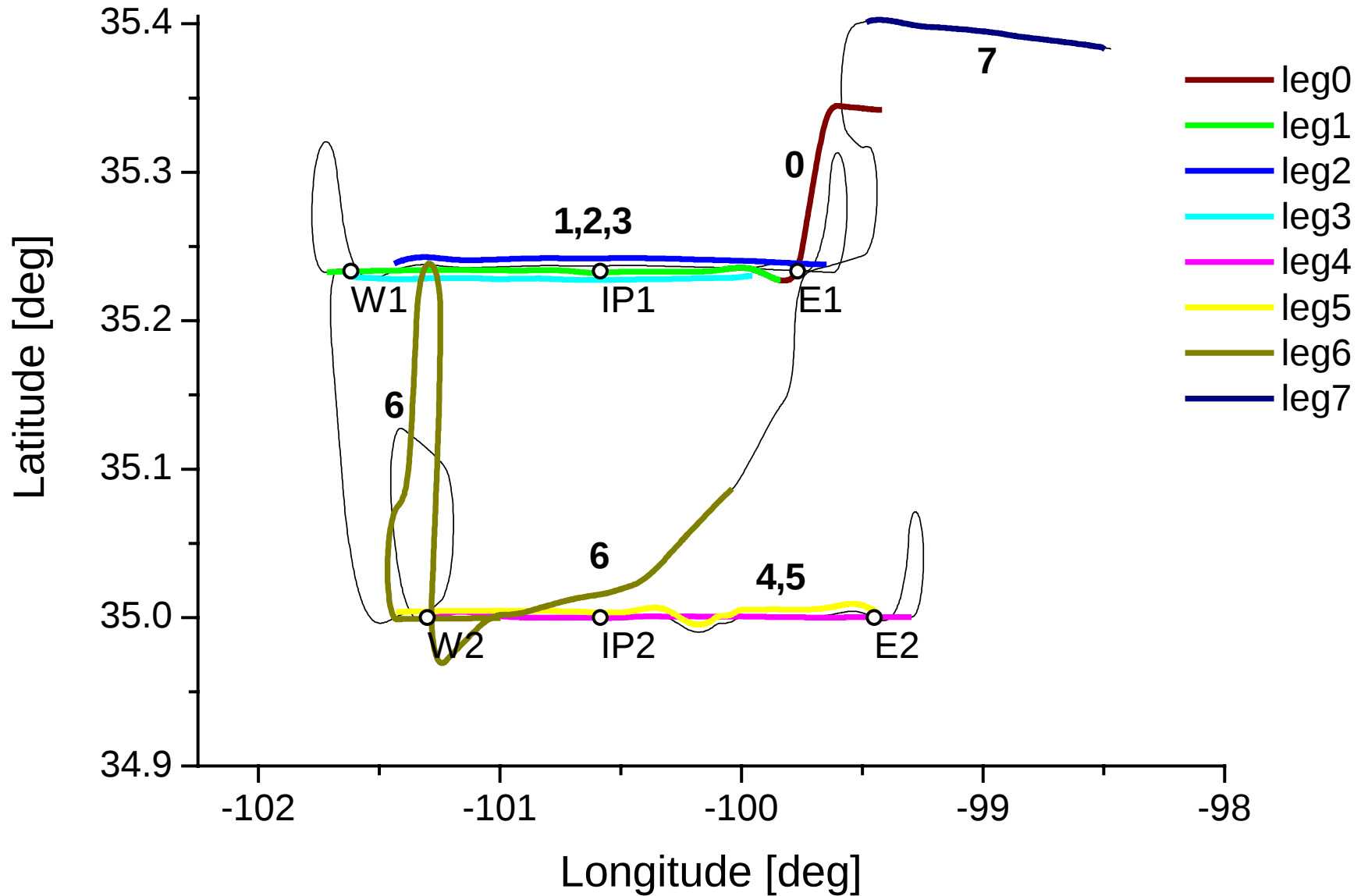
● NCAR Integrated Surface Flux Facility
▼ Learjet Dropsondes(8) 05/24 20:22:21 - 05/24 20:46:42 UTC

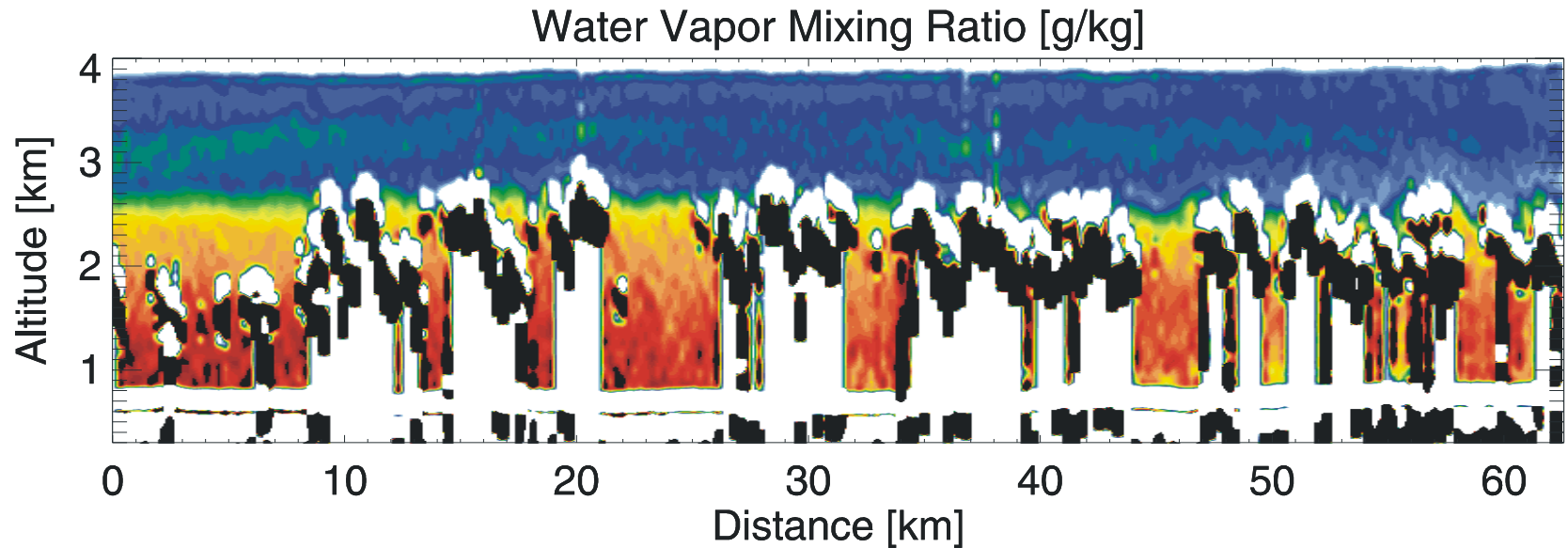
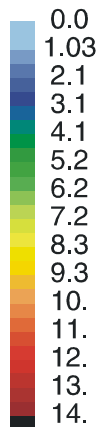
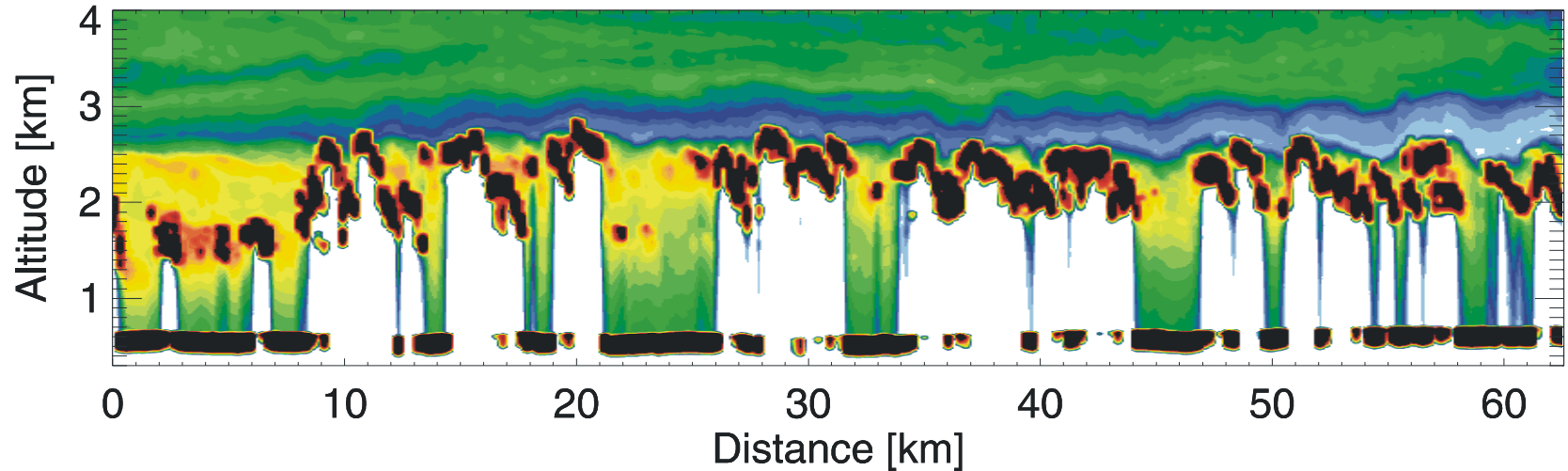
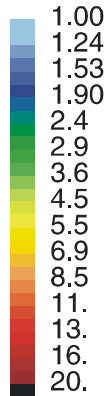
— NASA DC-8 05/24 16:58 - 05/24 22:58 UTC
— King Air 05/24 18:01 - 05/24 21:53 UTC
— Falcon 05/24 18:27 - 05/24 22:04 UTC
— NRL P-3 05/24 16:49 - 05/24 22:42 UTC





IHOP 05/24: Falcon flight route





Time [UTC]

18:50:00

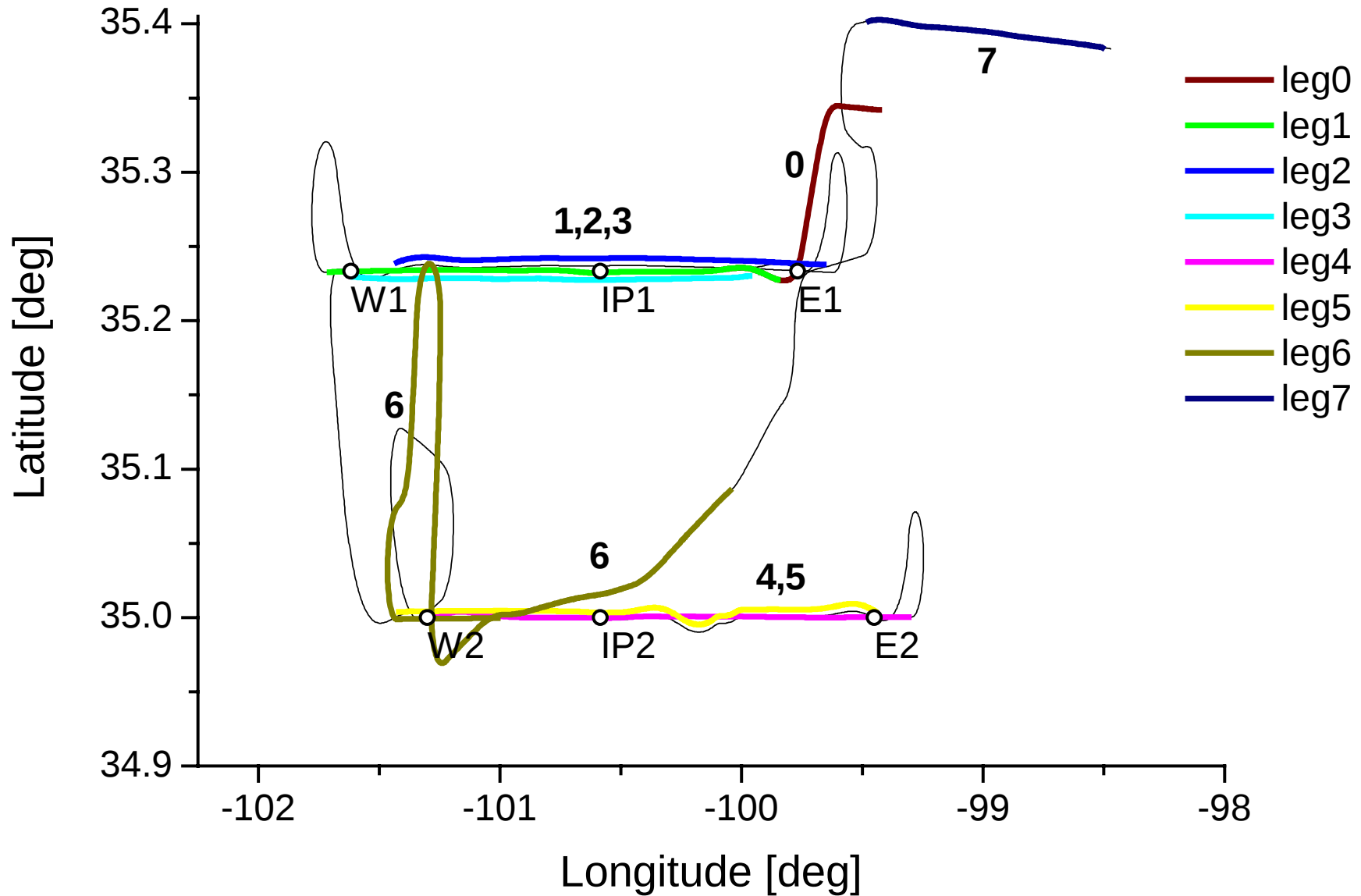
18:52:00

18:54:00

18:56:00

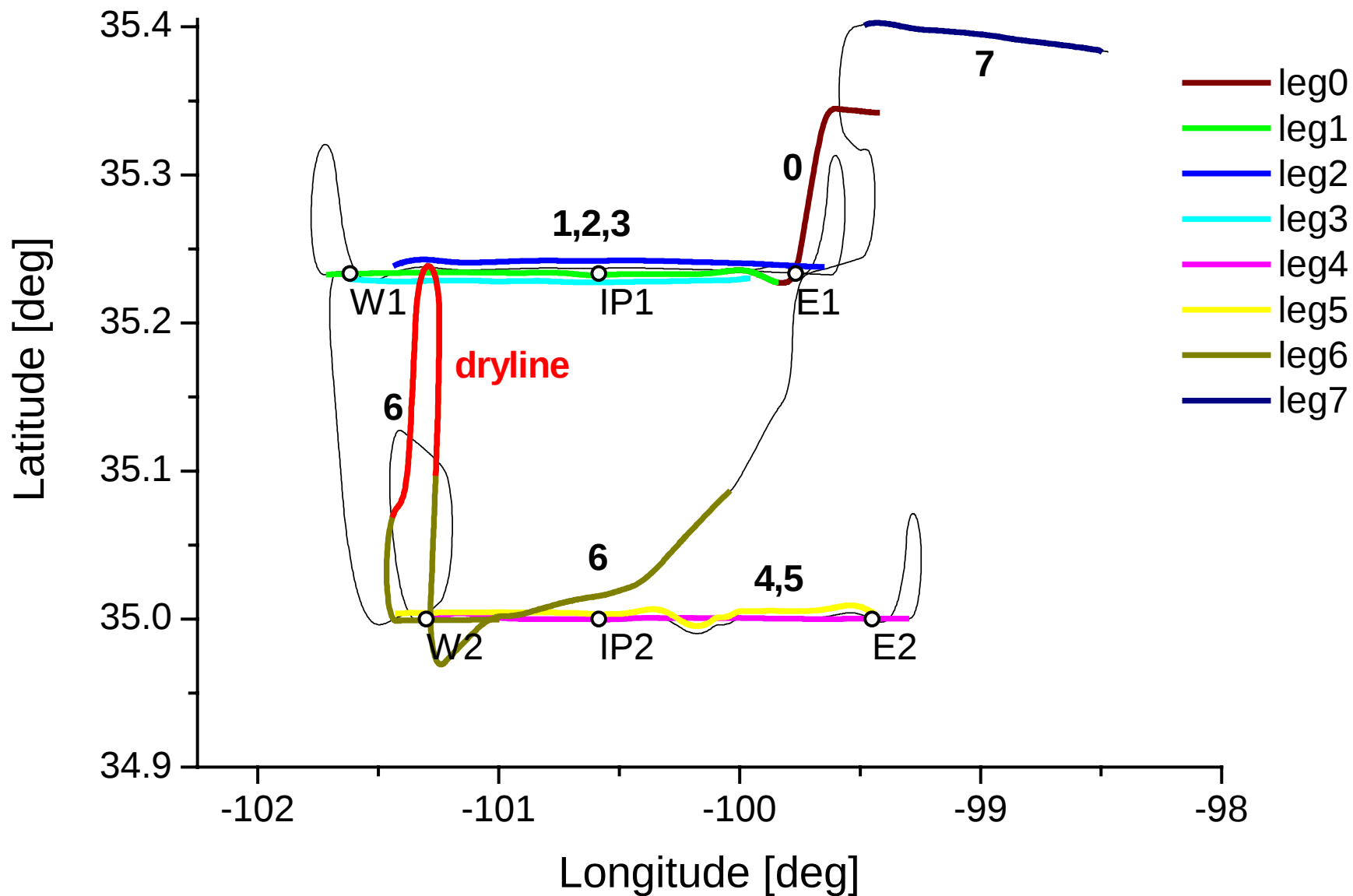


IHOP 05/24: Falcon flight route





IHOP 05/24: Falcon flight route

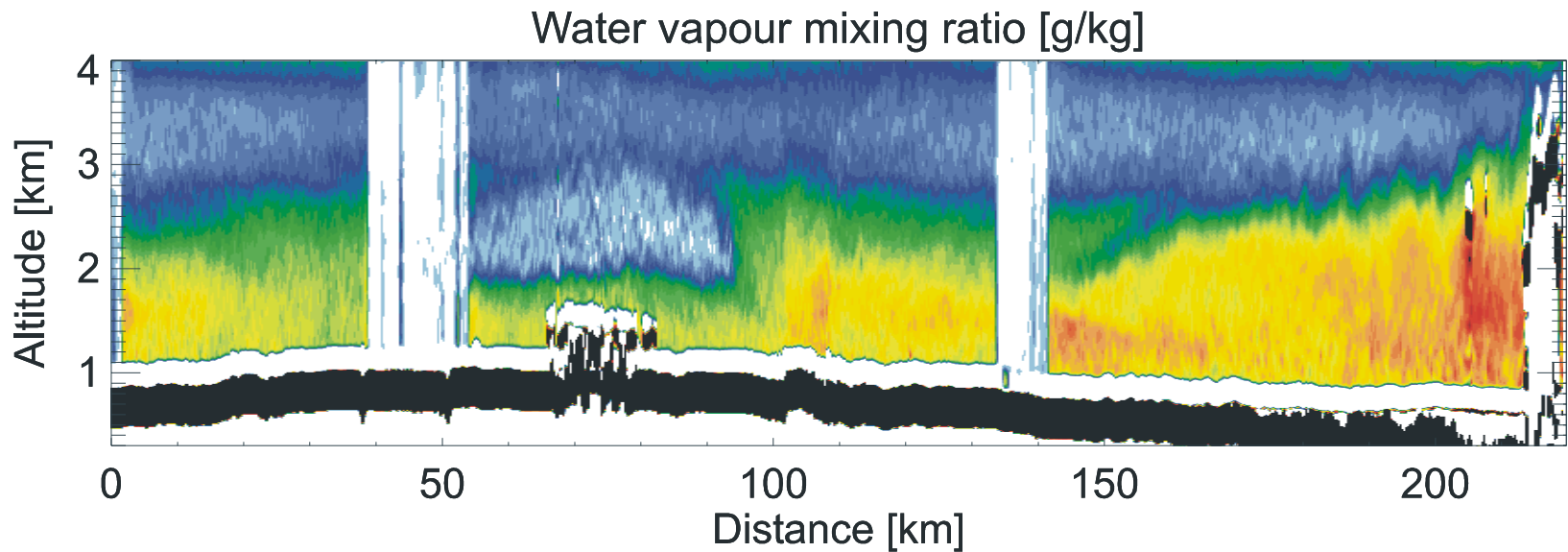
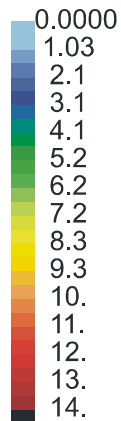
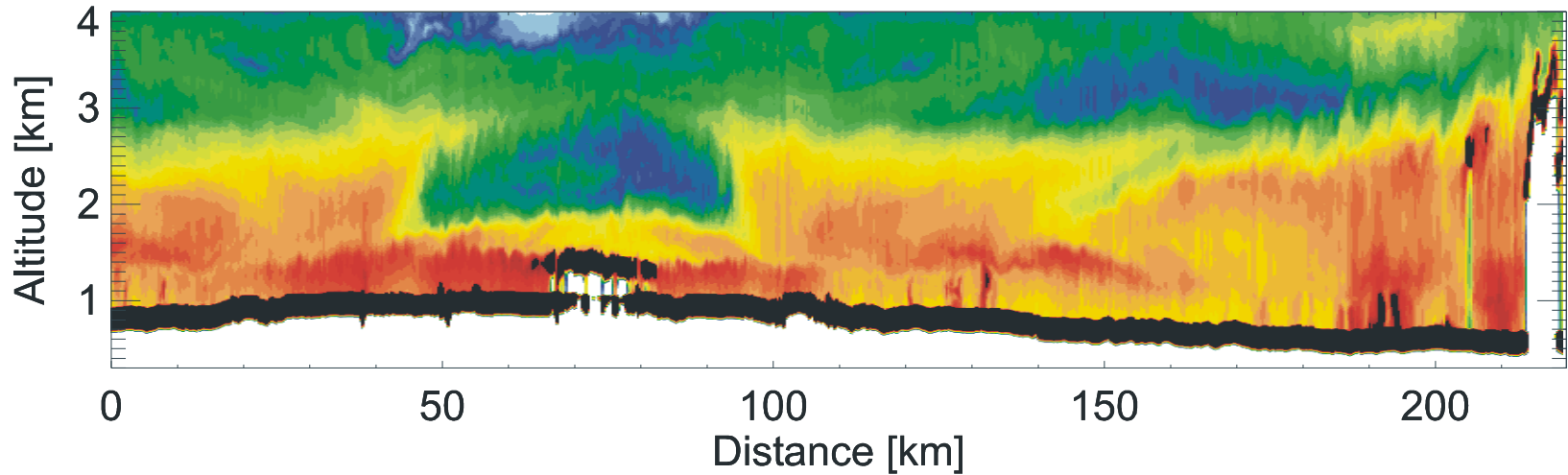
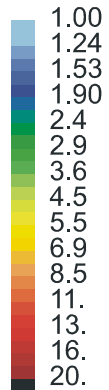




DIAL

IHOP 24. May 2002 5. Flight Leg 6 / dryline

Backscatter Ratio at 925 nm



Time [UTC]

21:10:00

21:15:00

21:20:00

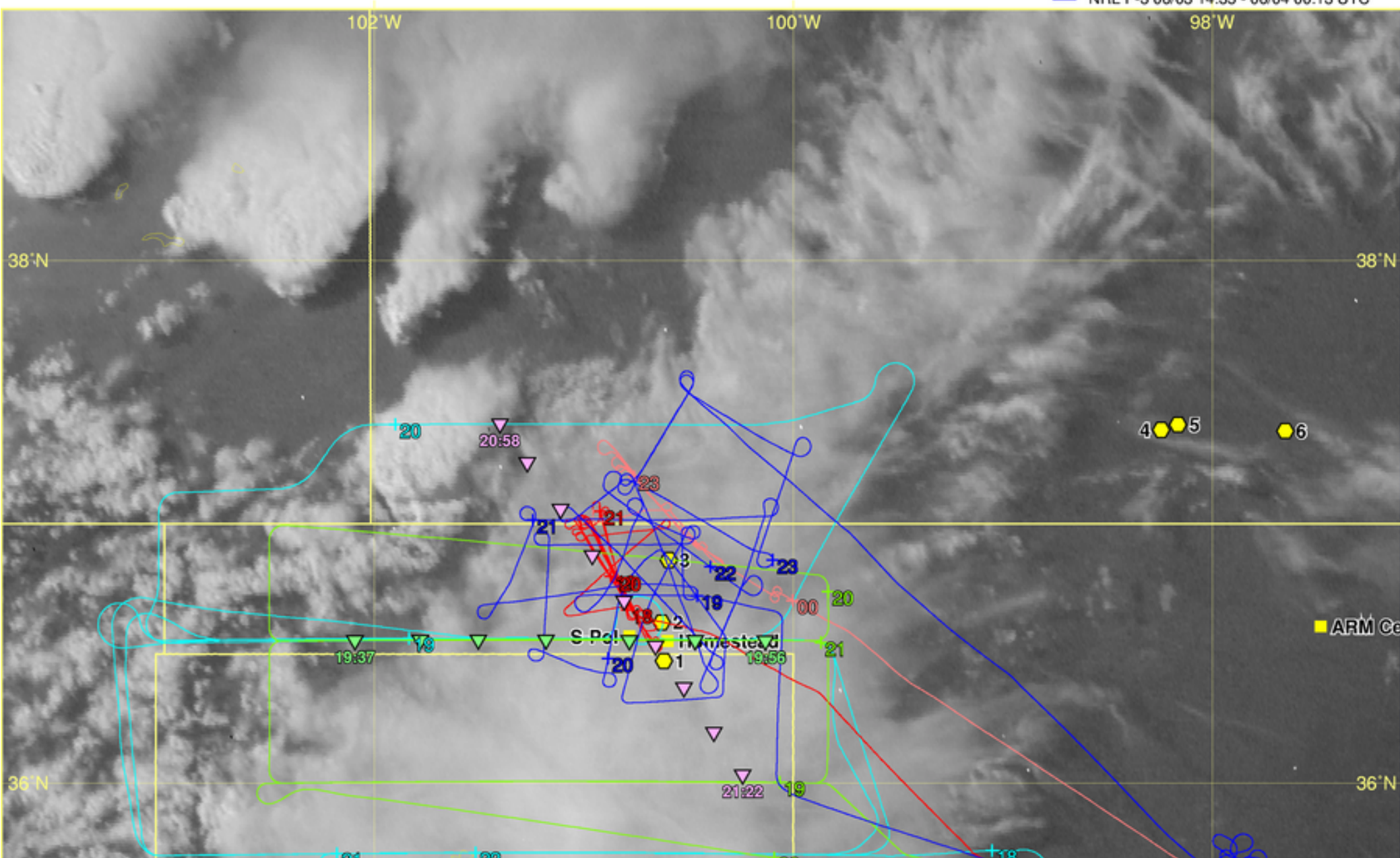
21:25:00

21:30:00

CI Mission 2002/06/03 1500-0400 UTC
GOES-8 1km visible 2002/06/03 21:55 UTC

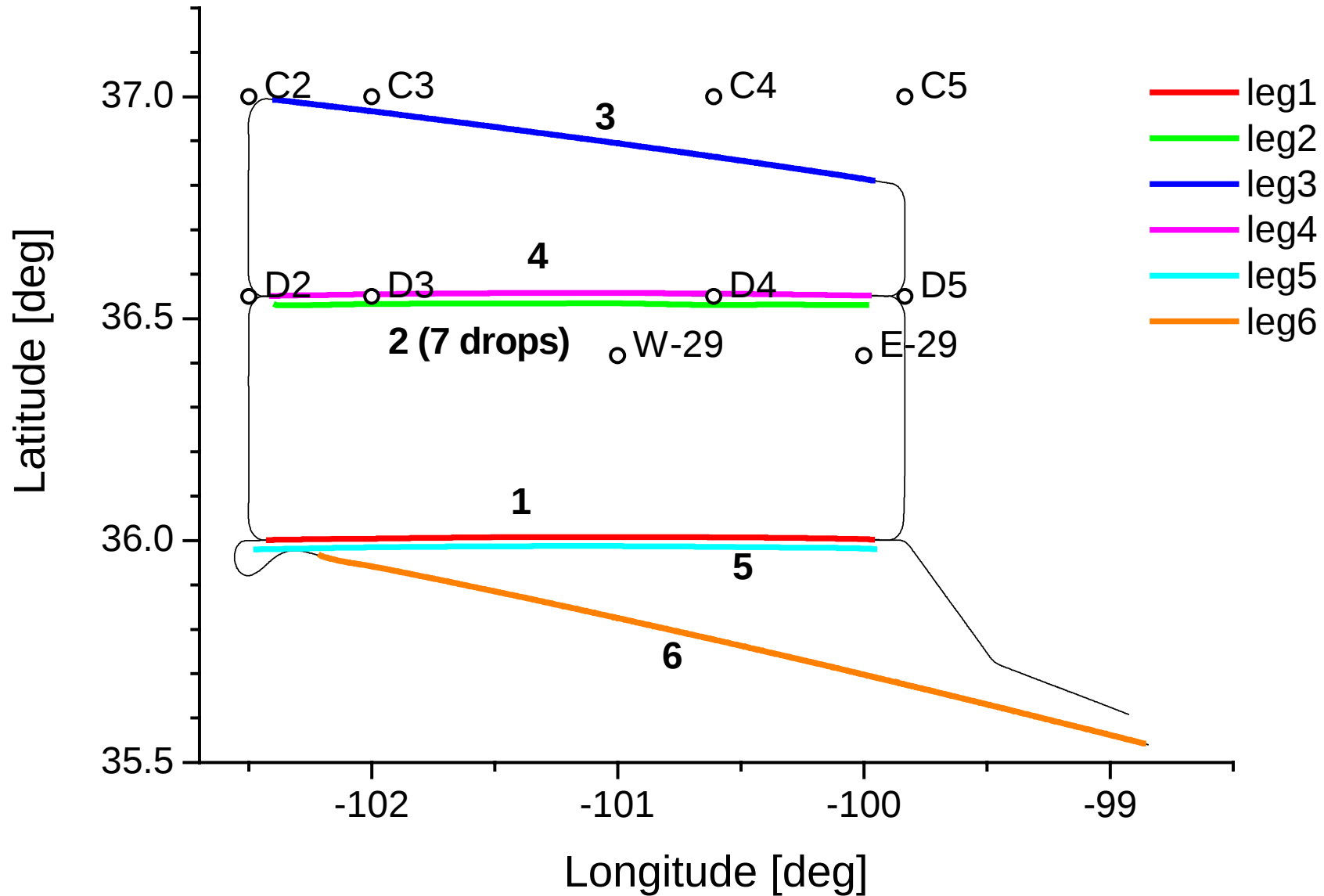
● NCAR Integrated Surface Flux Facility
▼ Learjet Dropsondes(9) 06/03 20:58:48 - 06/03 21:22:32 UTC
▼ Falcon Dropsondes(7) 06/03 19:37:10 - 06/03 19:56:04 UTC

— NASA DC-8 06/03 16:54 - 06/03 22:45 UTC
— King Air 06/03 16:48 - 06/03 21:07 UTC
— King Air 06/03 22:24 - 06/04 00:43 UTC
— Falcon 06/03 18:30 - 06/03 22:26 UTC
— NRL P-3 06/03 14:35 - 06/04 00:13 UTC





IHOP 06/03 #3: Falcon flight route

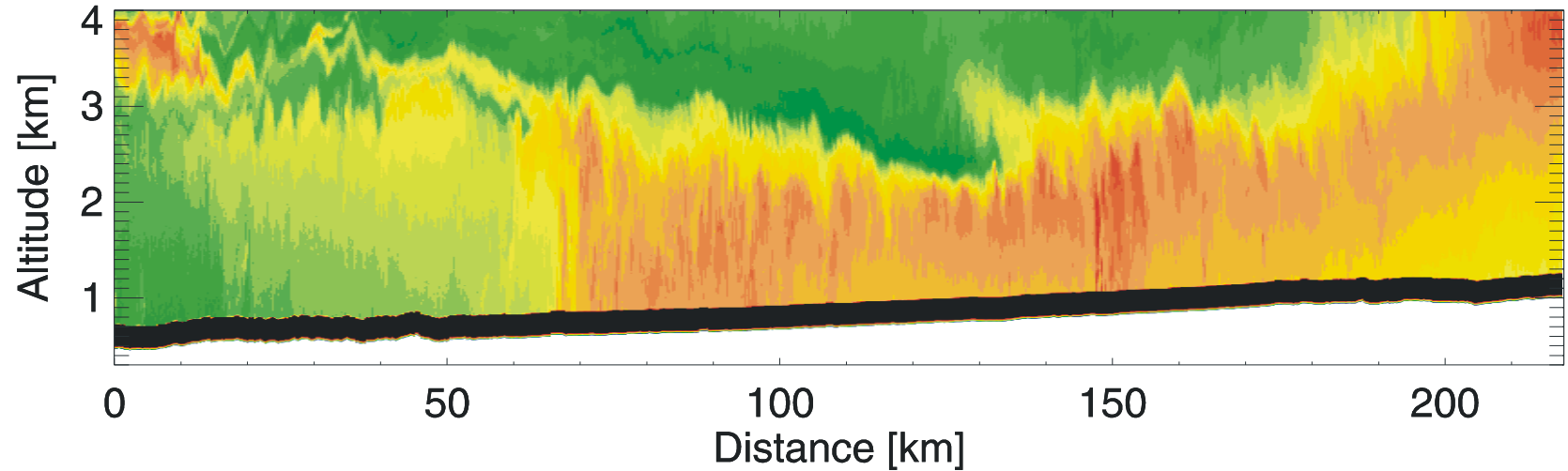
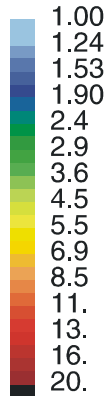




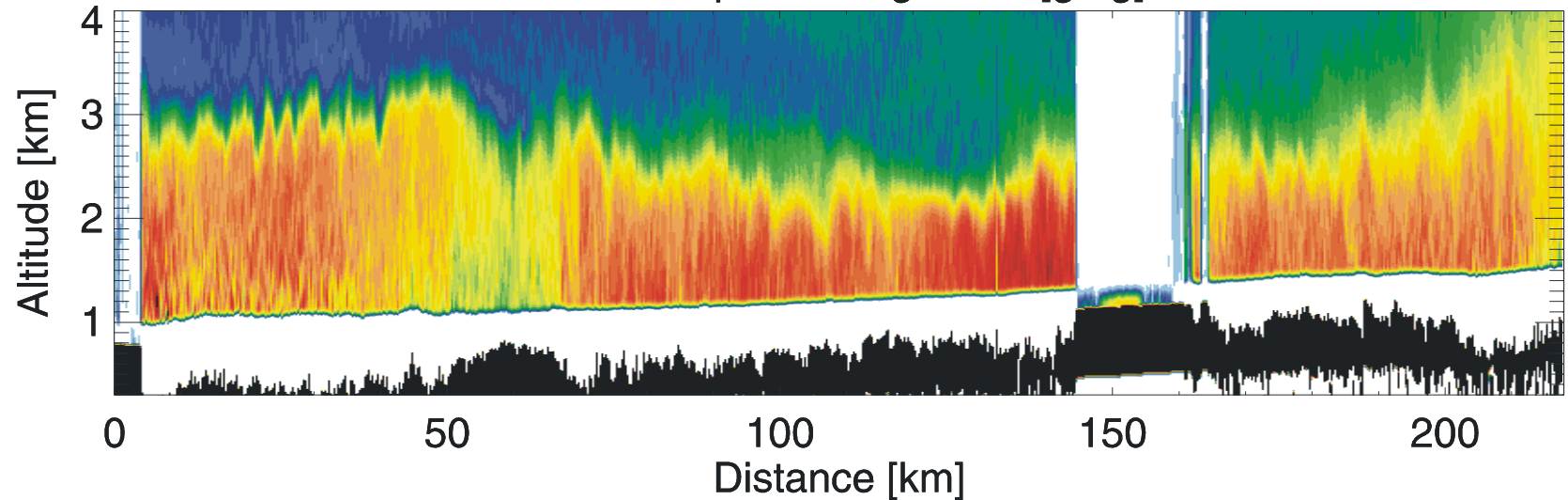
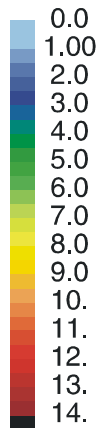
DIAL

IHOP 3. June 2002 13. Flight Leg 3

Backscatter Ratio at 925 nm



Water Vapor Mixing Ratio [g/kg]



Time [UTC]

20:05:00

20:10:00

20:15:00

20:20:00

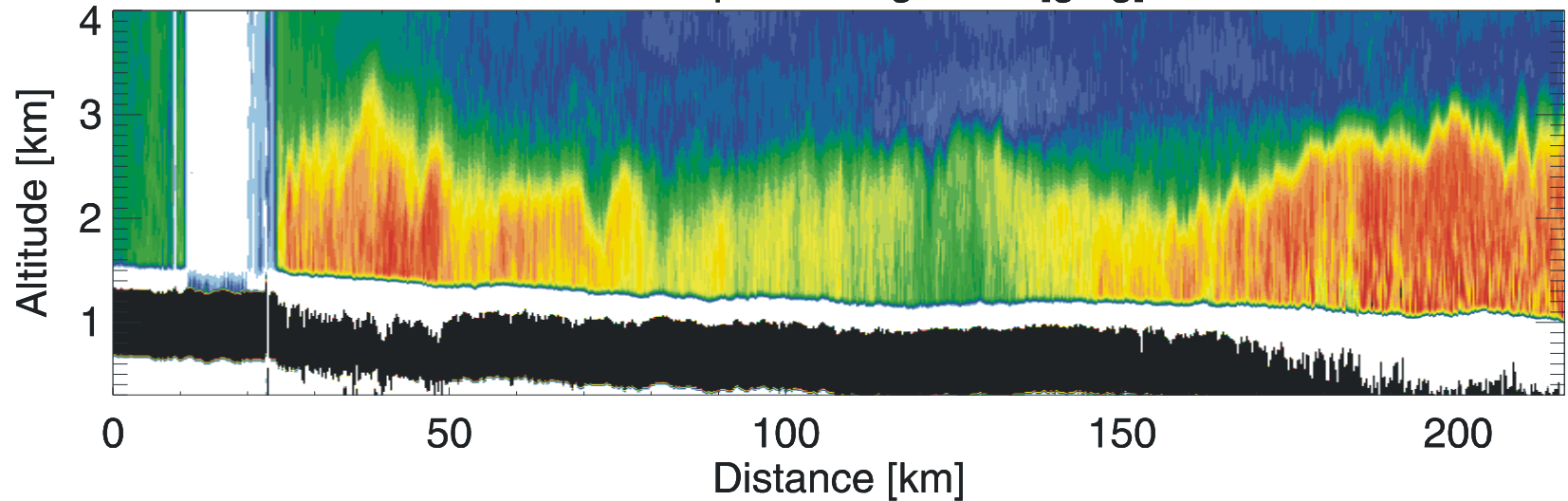
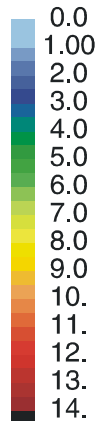
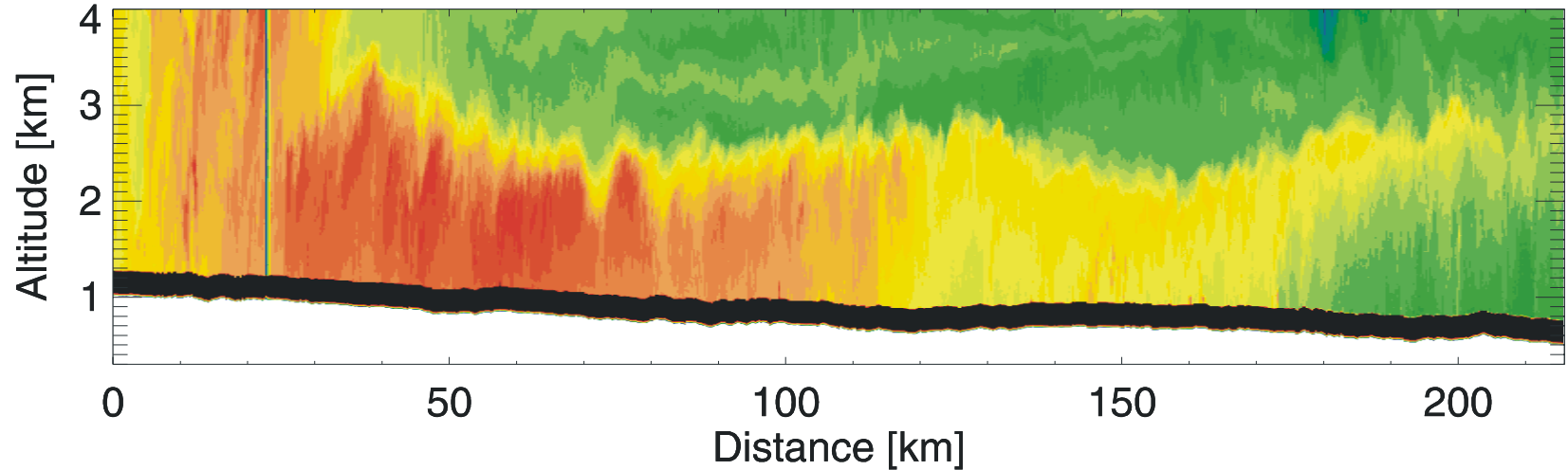
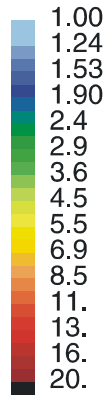
20:25:00



DIAL

IHOP 3. June 2002 13. Flight Leg 4

Backscatter Ratio at 925 nm



Time [UTC]

20:40:00

20:45:00

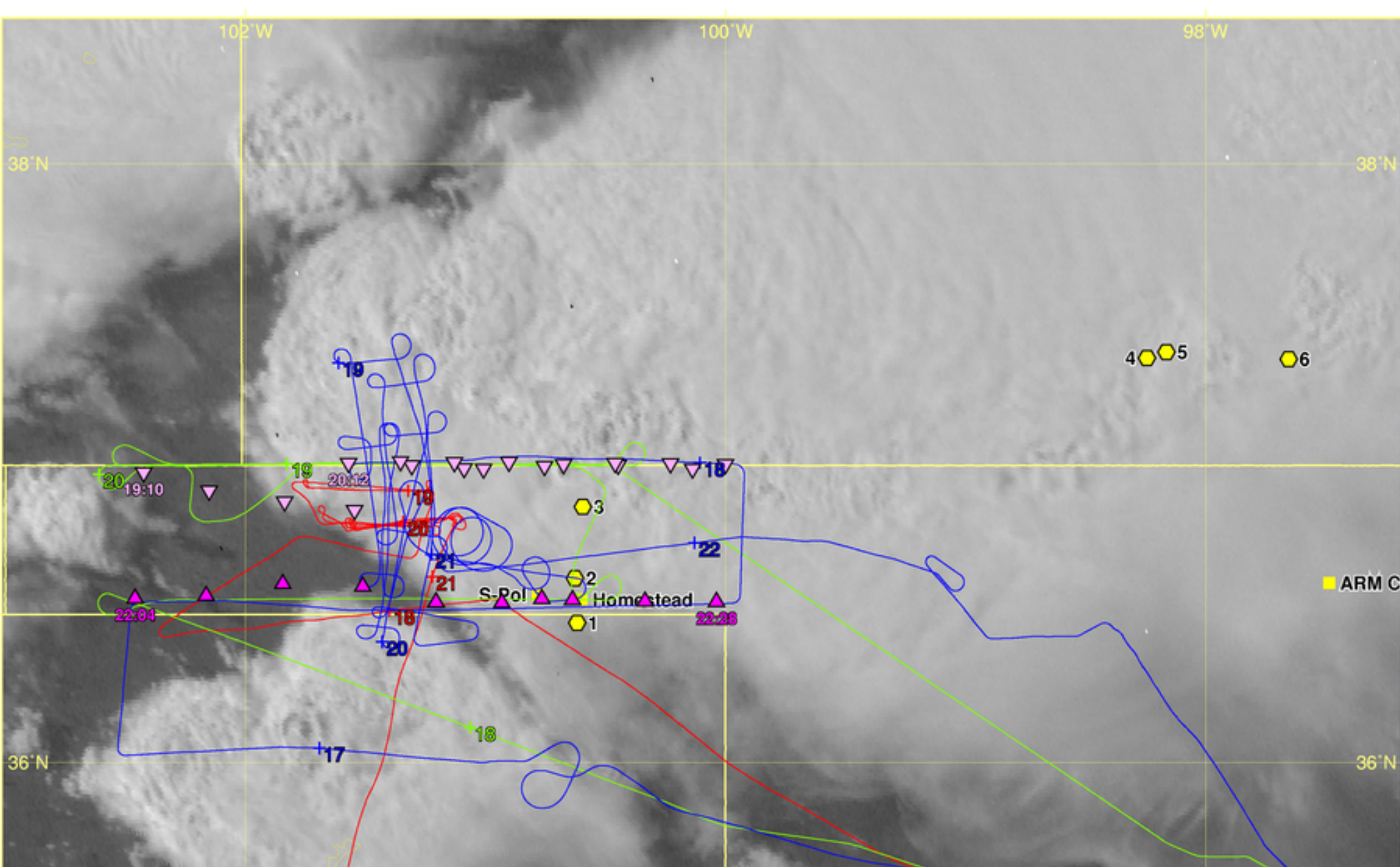
20:50:00

20:55:00

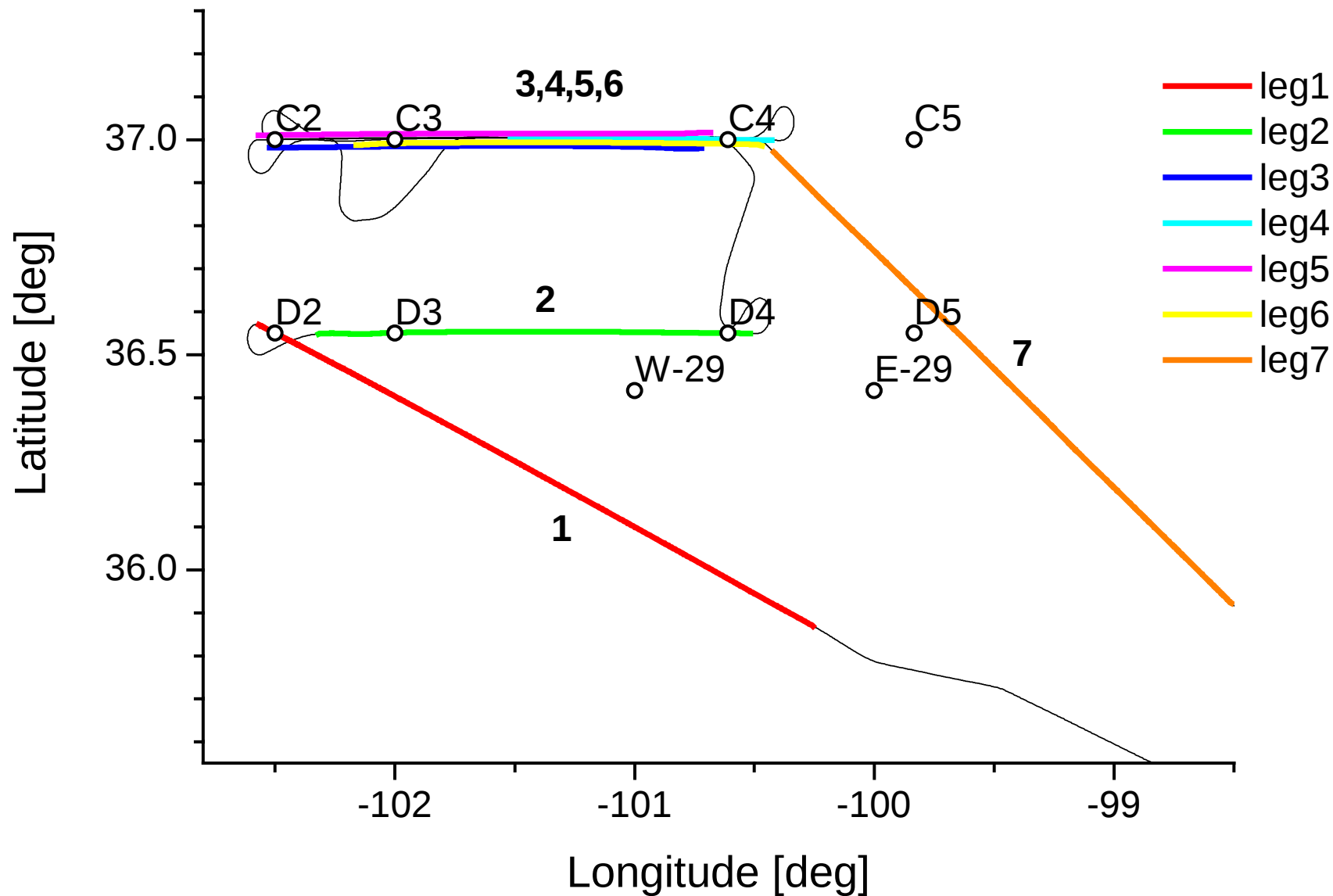
CI Mission 2002/06/15 1600-0000(?) UTC
GOES-8 1km visible 2002/06/15 22:39 UTC

● NCAR Integrated Surface Flux Facility
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▲ Learjet Dropsondes(10) 06/15 22:04:50 - 06/15 22:28:41 UTC

— King Air 06/15 16:37 - 06/15 21:33 UTC
— King Air 06/15 22:26 - 06/15 23:38 UTC
— Falcon 06/15 17:29 - 06/15 20:58 UTC
— NRL P-3 06/15 15:17 - 06/15 22:55 UTC



IHOP 06/15: Falcon flight route

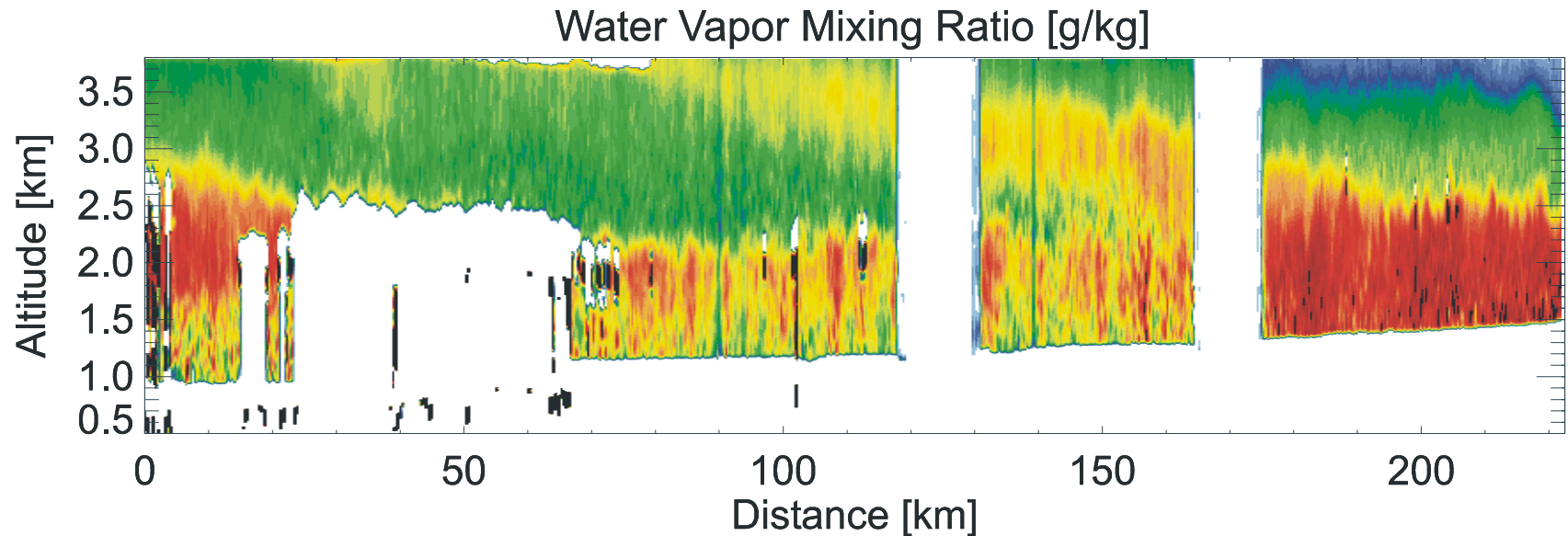
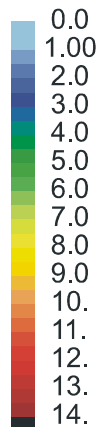
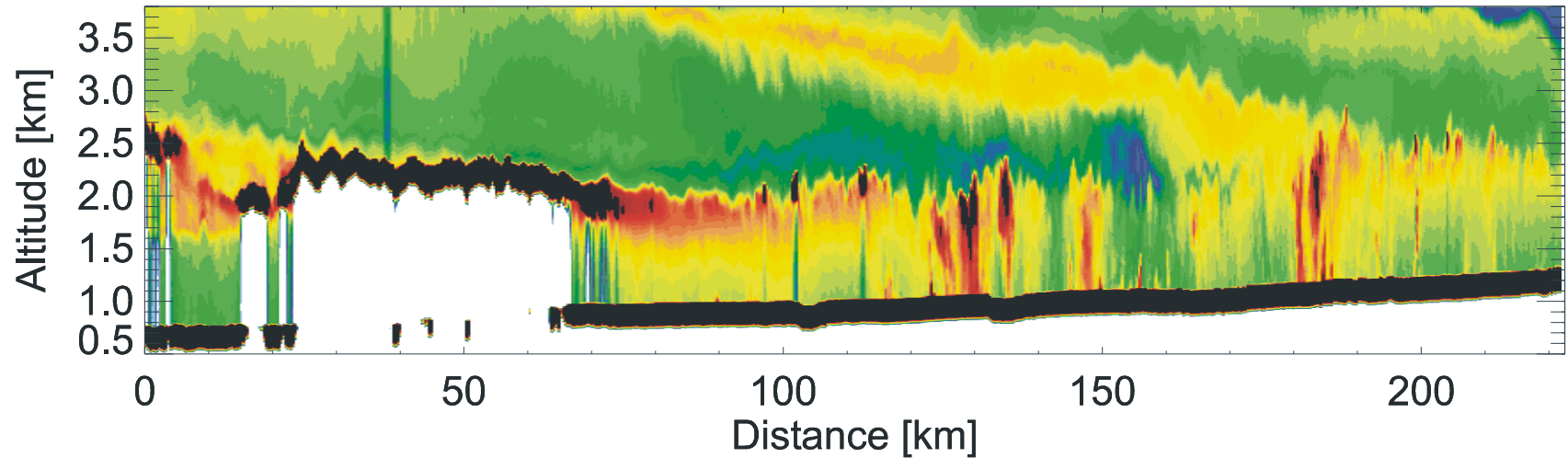
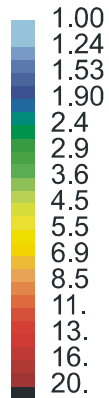




DIAL

IHOP 15. June 2002 21. Flight Leg 1 (E->W)

Backscatter Ratio at 925 nm



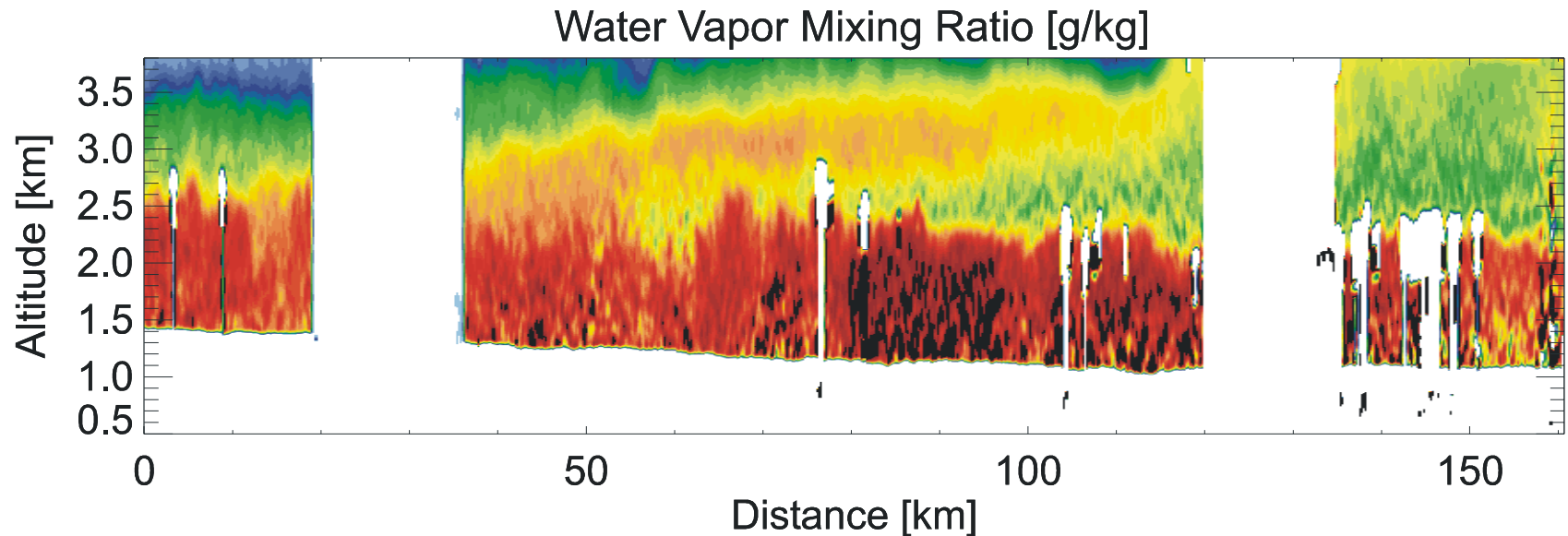
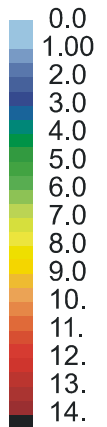
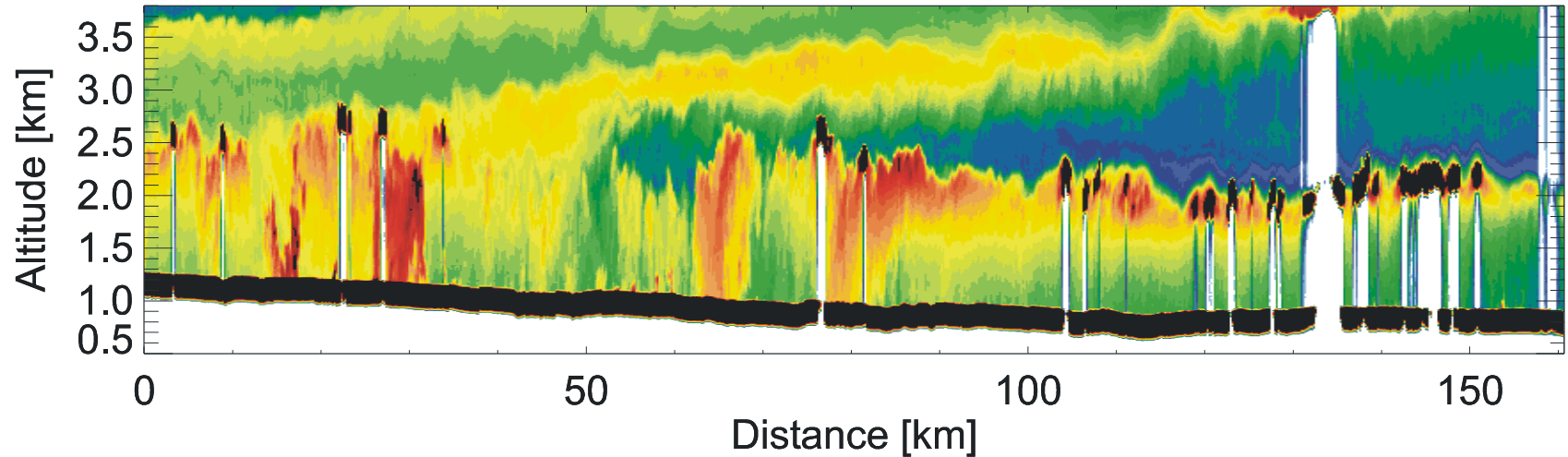
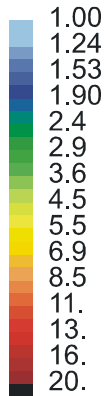
Time [UTC]

17:55:00

18:00:00

18:05:00

18:10:00



Time [UTC]

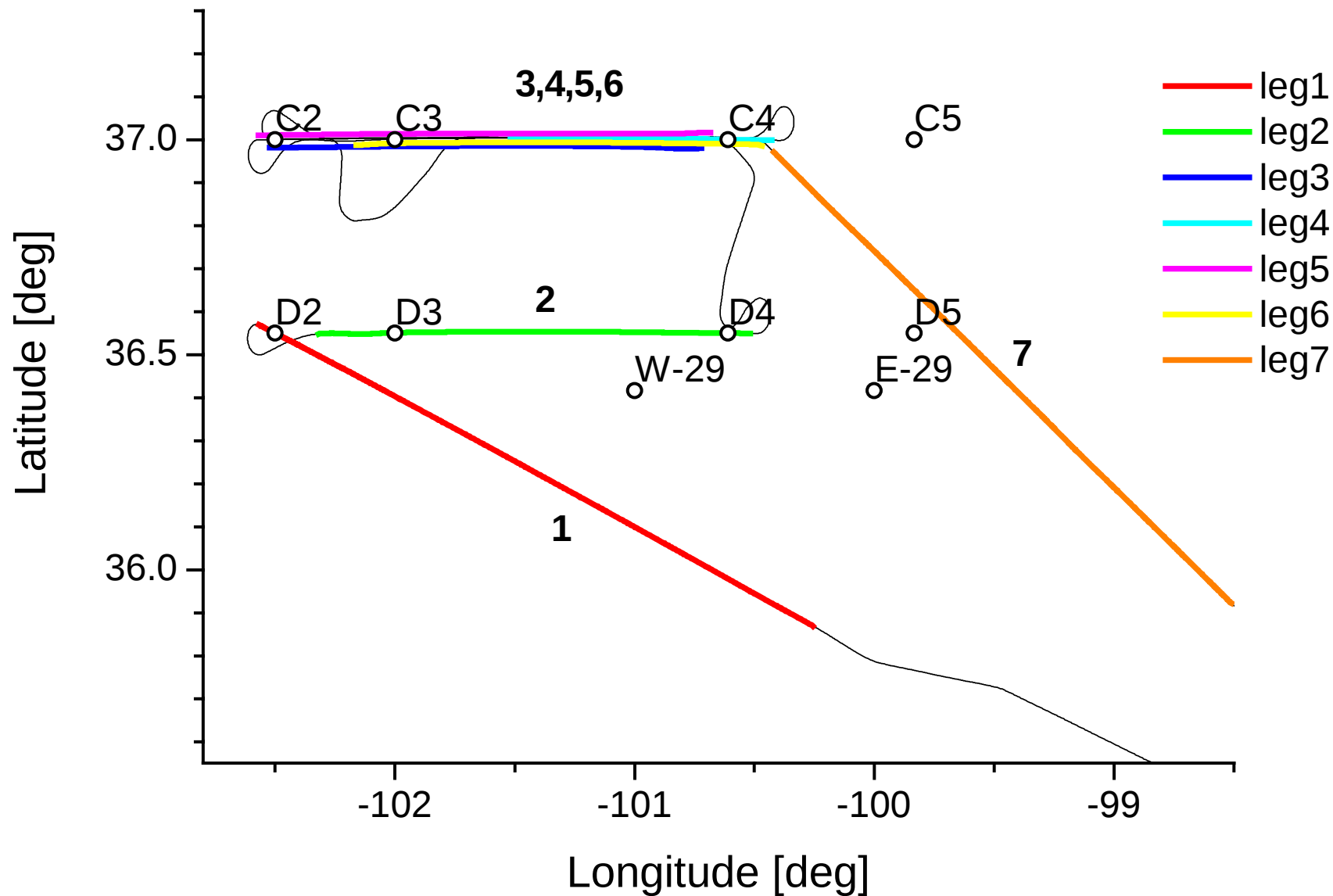
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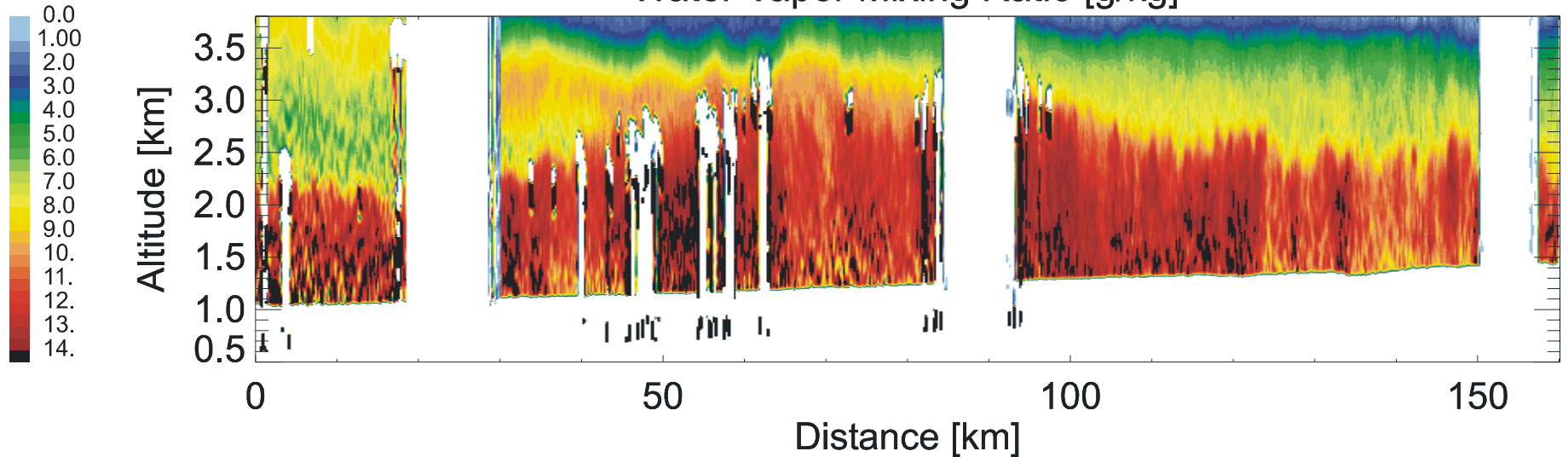
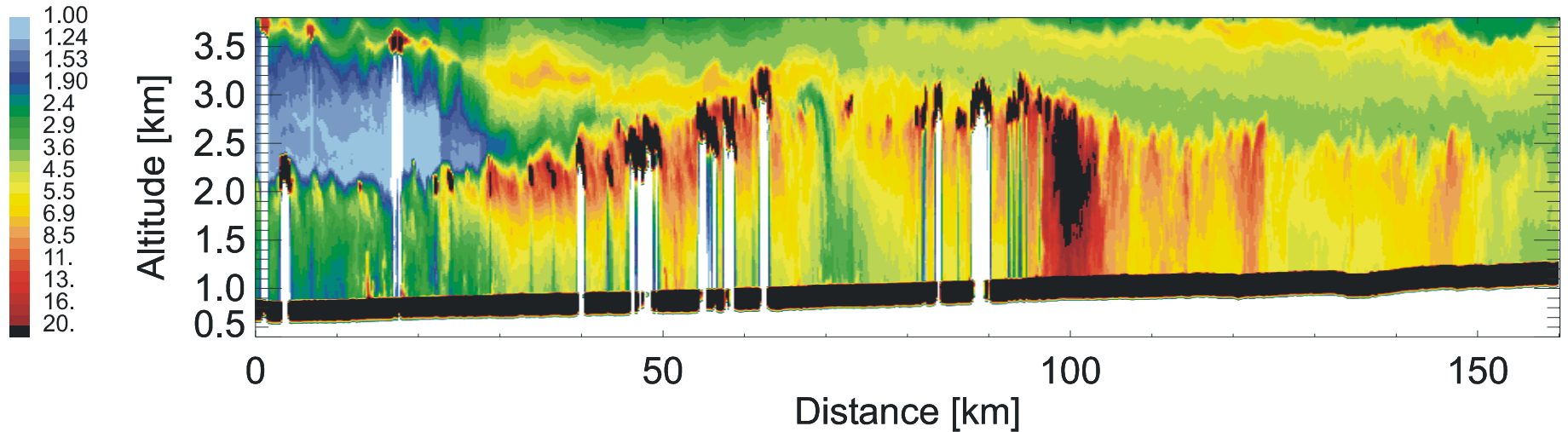
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18:30:00

18:35:00

IHOP 06/15: Falcon flight route



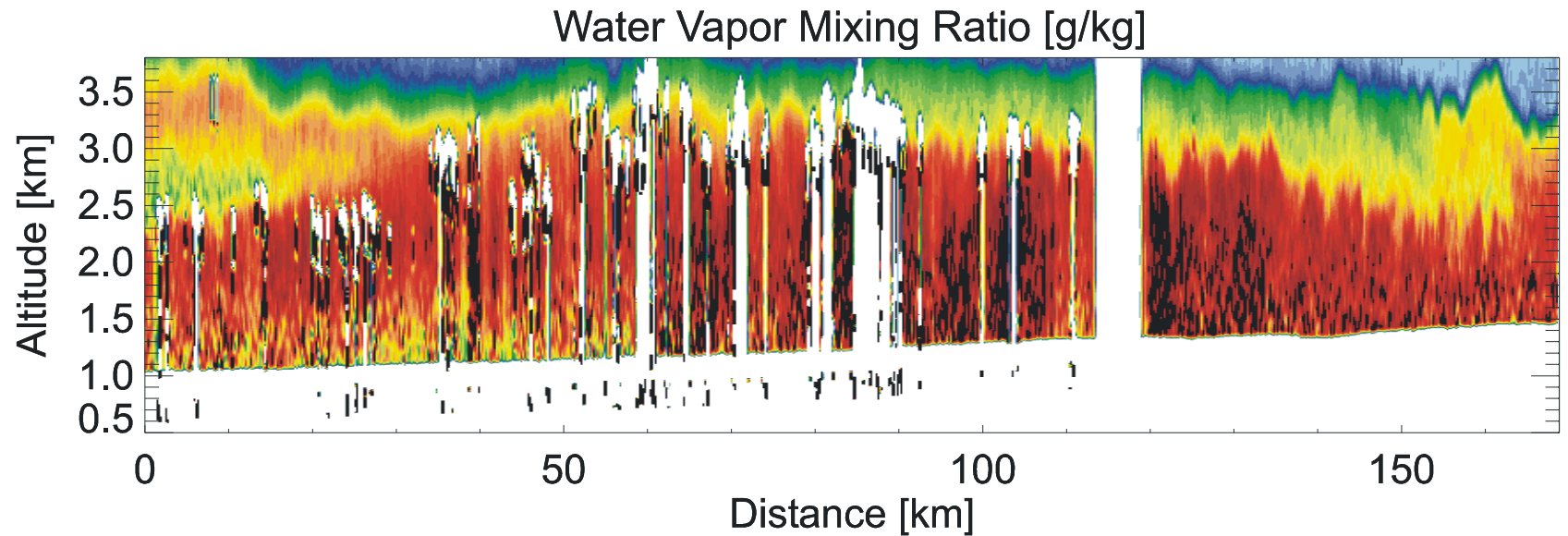
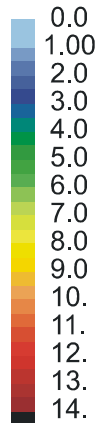
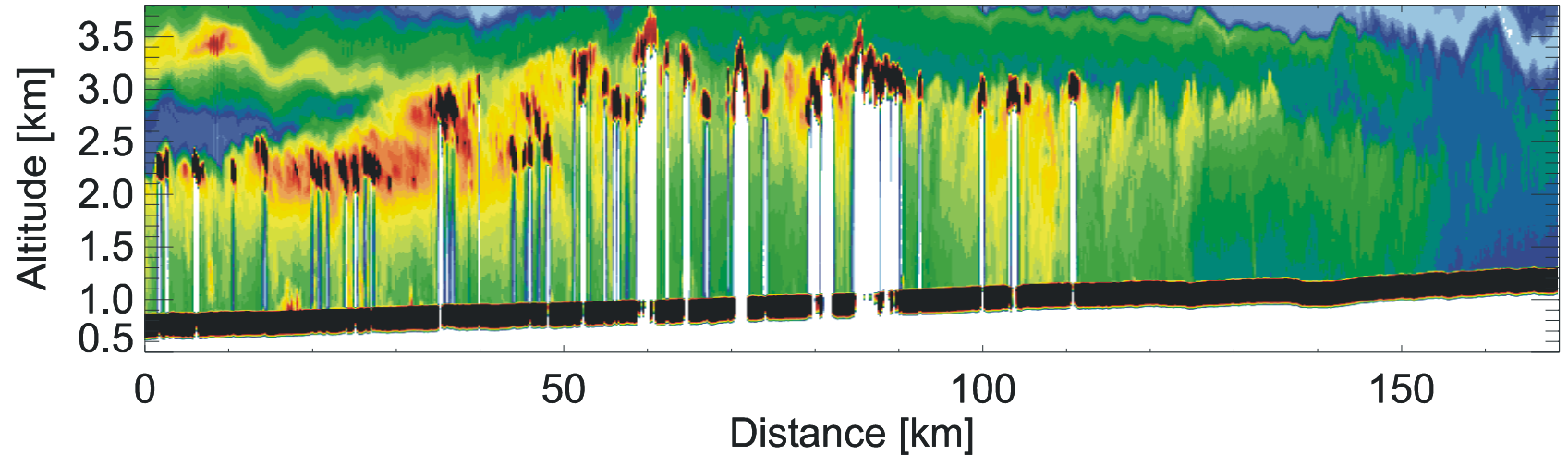
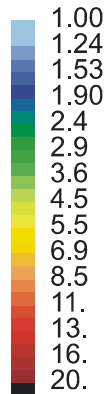




DIAL

IHOP 15. June 2002 21. Flight Leg 5 (E->W)

Backscatter Ratio at 925 nm



Time [UTC]

19:40:00

19:45:00

19:50:00

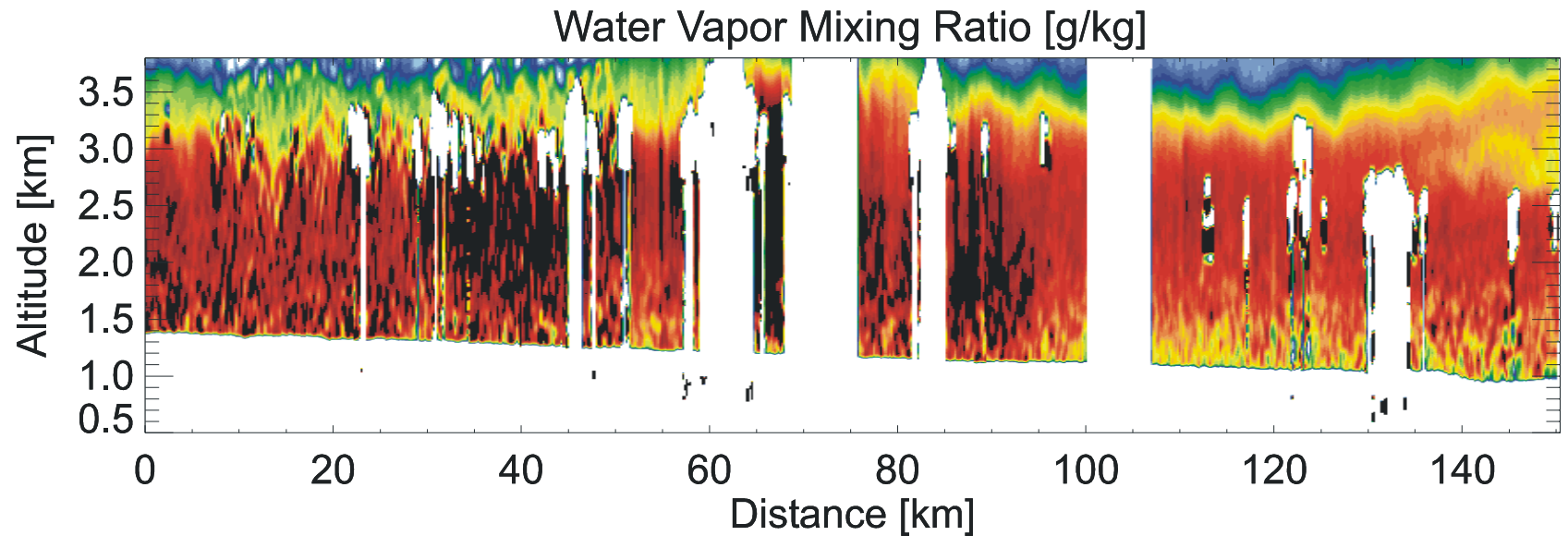
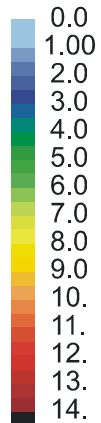
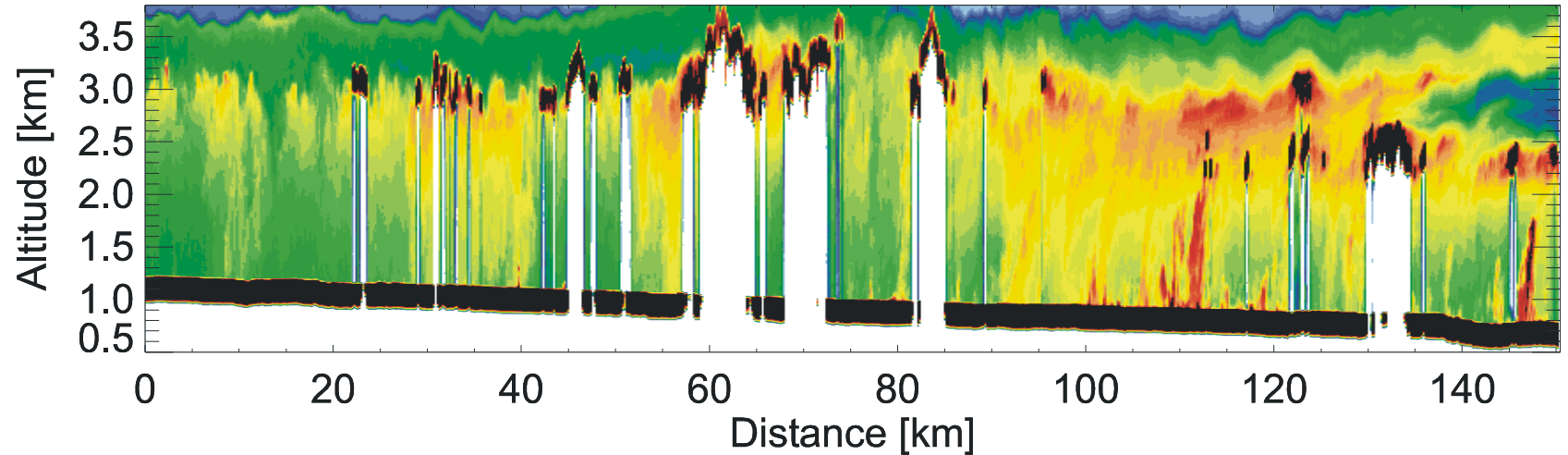
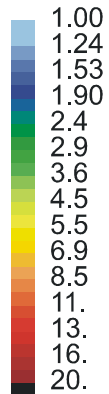
19:55:00



DIAL

IHOP 15. June 2002 21. Flight Leg 6 (W->E)

Backscatter Ratio at 925 nm



Time [UTC]

20:05:00

20:10:00

20:15:00

20:20:00

Outlook:

- **Improvement of preliminary results considering**
 - **available p and T profiles**
 - **measured spectral properties of DIAL transmitter**
- **Intercomparison with other instruments**
- **Cooperations**