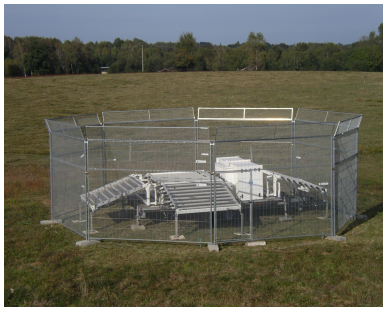
CNRM and CRA UHF Wind Profilers
Sites 1 and 2
15 June 2011- 05 July 2011

Comparison of main parameters during the whole period and for each IOP

Laboratoire d'Aérologie, Université de Toulouse
UPS-CNRS 5560, France
Contact: Frédérique Saïd, LA-OMP, frederique.said@aero.obs-mip.fr

CNRM LISA-GMEI, Météo-France
Contact: Jean-Marie Donier, jean-marie.donier@meteo.fr

B. CAMPISTRON, JM. DONIER, and F. SAID
Y. BEZOMBES, 0. BOUSQUET, S. DERRIEN, T. DOUFFET and O. GARROUSTE



Blank page

The radars were located on the Lannemezan plateau, 5.1 km apart, and site 2 is situated 6 km north to the southern edge of the plateau, at the foothills (Fig. 1 and Table 1). Both radars had a fence to protect them against ground clutter echoes. As the two radars worked at the same frequency (1274 MHz), the direction of their beams were arranged so as to minimize interferences: the radars (front towards rear) were aligned 15° west to the north at site 1 and 22° at site 2. The two radars were operated with the same data collection modes (with a low (0-4km) and a high mode (0-7km) (see the individual reports). The only difference was the pulse length for the low mode, that was 150 m for the site 1 radar and 300 m for the site 2 one. The consequence is the vertical resolution which is 75 m and 150 m respectively. Nevertheless, the data were over-sampled in the second case to provide a similar spatial resolution. The same processing has been applied to both radars.

	Site 1 CRA UHF	Site x CNRM UHF
Latitude	43°07'27.15" N	43°05'8" N
Longitude	0°21'45.33" E	0°21'0" E
Altitude	595 m	641 m

Table 1: Sites coordinates

Figure 1: The UHF profilers are installed on sites 1 and 2, on the Lannemezan plateau

The aim of the comparison is to provide some kind of validation of the data, showing that data are very similar on average, but also to highlight differencies at low level linked

to the different locations. Height-time cross sections are not shown here since they all are collected in specific reports in the database.

The comparison is in term of vertical profiles (mean and standard deviation), averaged during

- First period: 14 days from June 15 to June 28
- Second period: 5 days from July 1 to July 5
- 24h for each IOP day.

The comparison show very few differencies :

- Wind velocities and directions are similar except on June 24 when the wind velocity and wind direction are slighly different up to 1000 m due to the weakness of the wind (around 3 ms^{-1} whereas the average in June is around 4 ms^{-1} under 1000 m). Its direction is also highly variable in time (large standard deviation) and vertically (turning from north at the surface to west and then south-west at 1000m) The wind direction standard deviation is slightly larger in site 2. Larger discrepancies are encountered on June 27, especially on the wind direction which is highly variable (between south-east and north-east), in both cases, up to 2000 m. The windspeed average is around 4 ms^{-1}.
- The reflectivity absolute values are different: this is expected since the radars have not the same calibration constant. However, the profiles are similar.
- The noise profiles are different. There is a problem of noise, varying with height on the site 1 radar, that we have been trying to solve with the manufactor (unsuccessfully up to now). The site 2 radar shows a larger time variability linked to the air conditioner (the temperature decreases when it starts which makes the noise decrease). The steep decrease of the site 2 noise close to the surface is due to a technical adjustment made to decrease the power close to the surface to prevent the receiver saturation. All these remarks on the noise have no effect on the wind measurements. The only consequence is when the reflectivity is used to calculate rainfall for instance. During BLLAST, relative values of the reflectivity are successfully used to detect the top of the boundary layer (see the height-time cross sections of reflectivity in the individual reports).
- Aspect ratios are systematically more variable in time and positive in the lower layers at site two. Aspect ratios should be closed to 0, indicating similar power on the vertical beam to the median power of the oblique beams . This point should be further investigated, by trying to find which beam is responsible for this discrepancy (perhaps one beam is more sensitive to ground echoes).

Finally, it should be noted that on the average the upper levels (5-7 km during June; 2-5 km during July) are more subsident than the lower ones, with mean vertical velocities reaching -0.8 or -1 ms^{-1} at 7 km (rainfall episods have been discarded). Remember that the absolute values of the vertical velocity must be used with caution due to the well-known negative bias of the UHF profilers. Nevertheless, the upper level vertical velocities clearly show lower velocities than those at the lower layers.

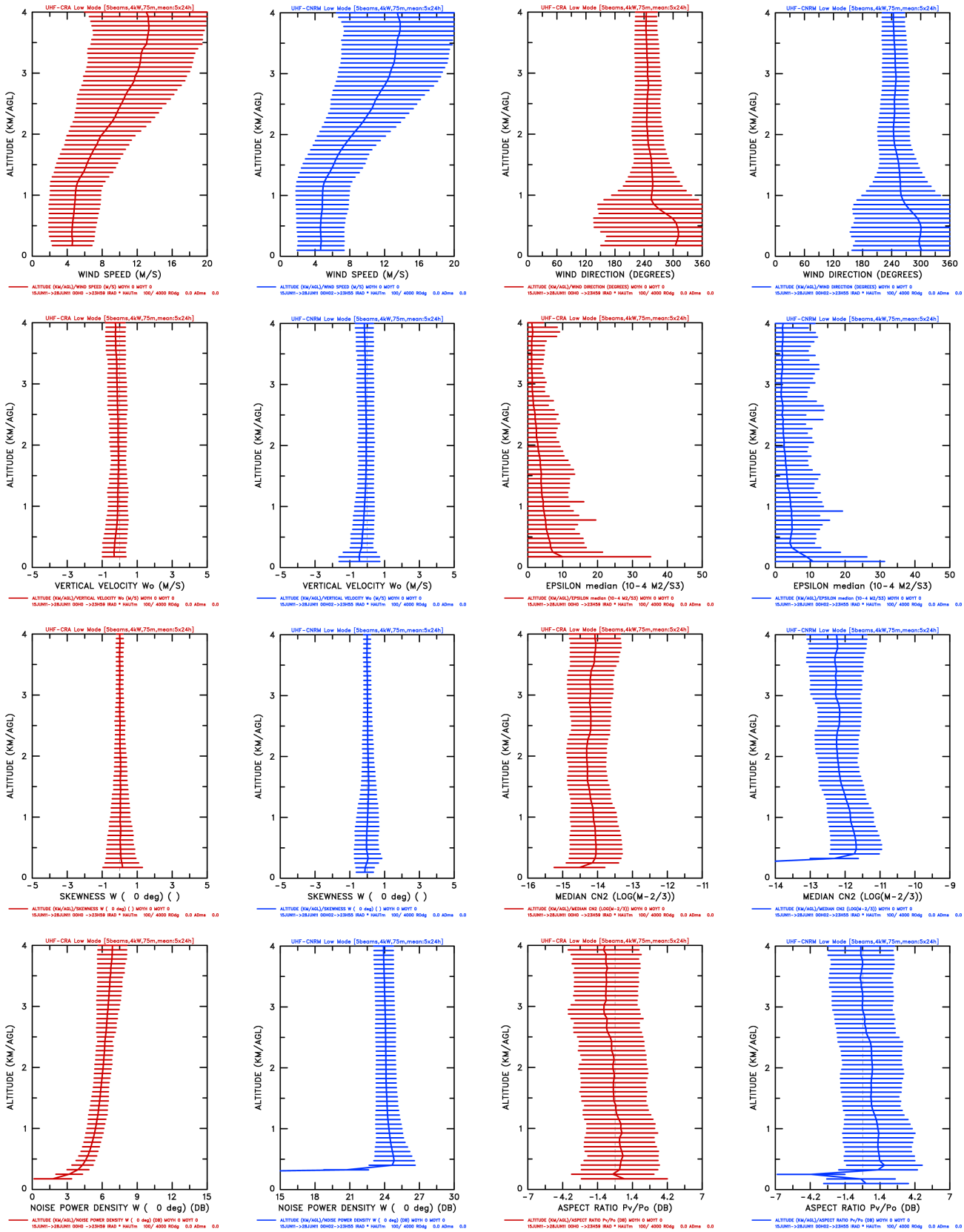


Figure 2: **First period: low mode with (red) site 1, (blue) site 2**

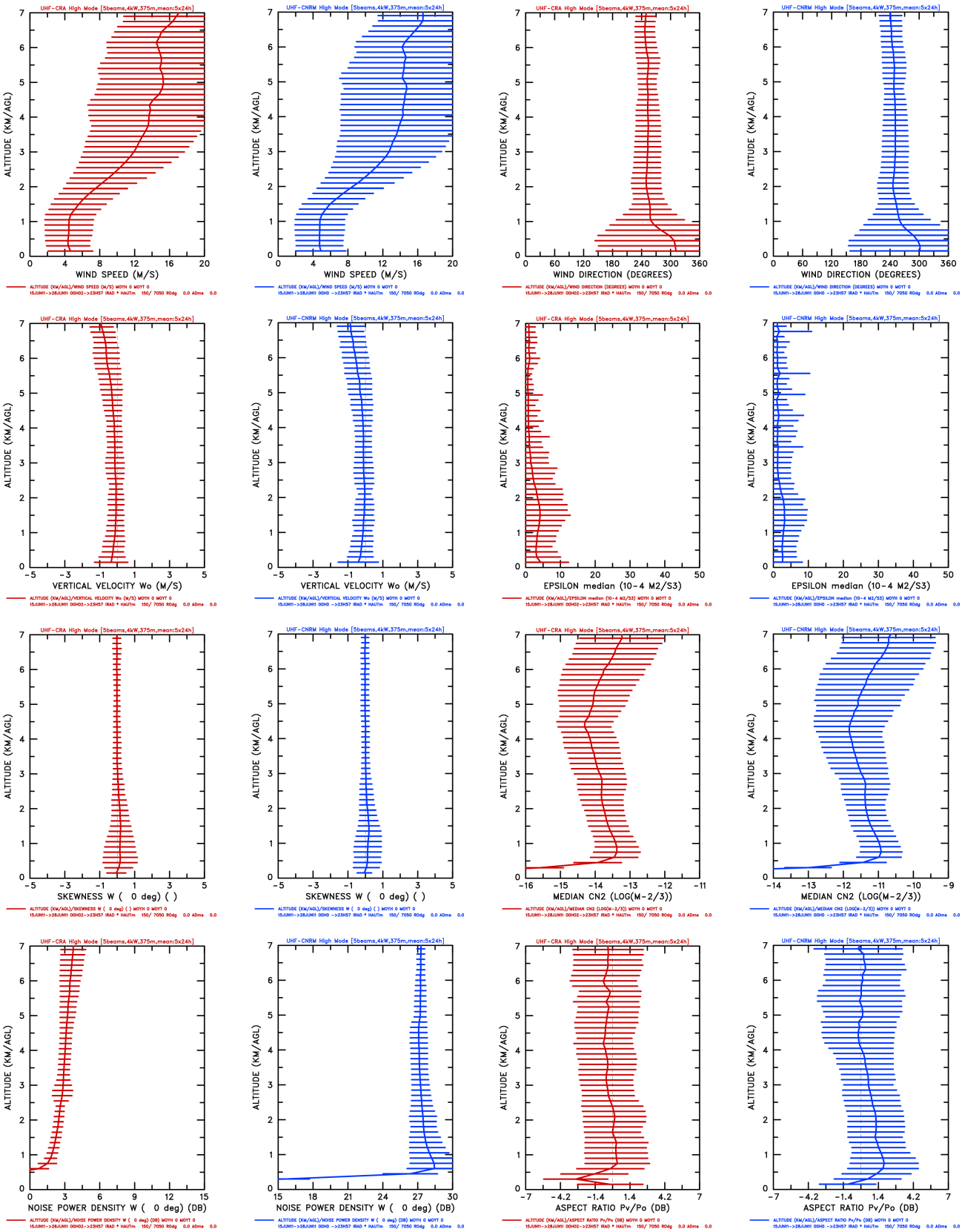


Figure 3: **First period: high mode with (red) site 1, (blue) site 2**

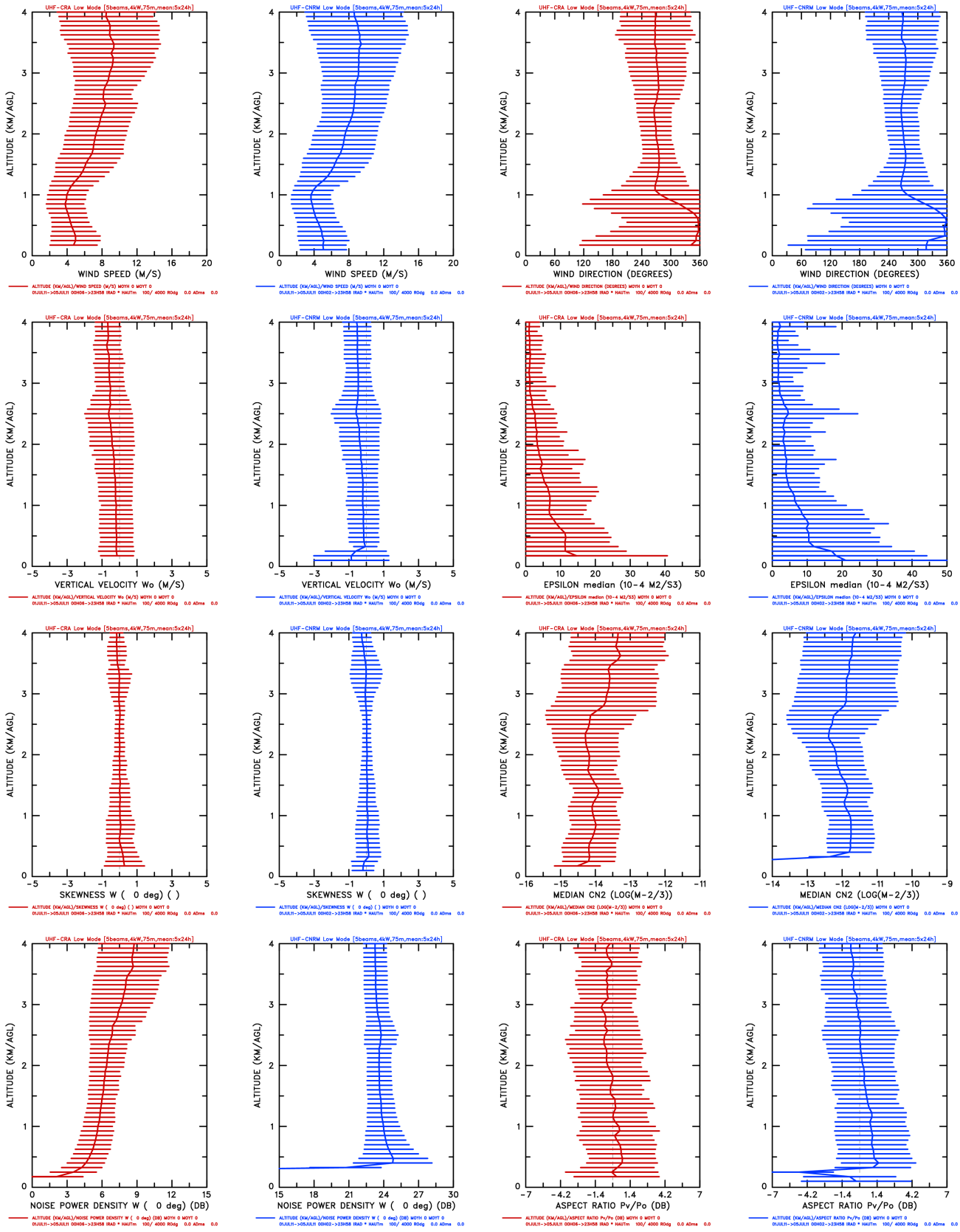


Figure 4: **Second period: low mode with (red) site 1, (blue) site 2**

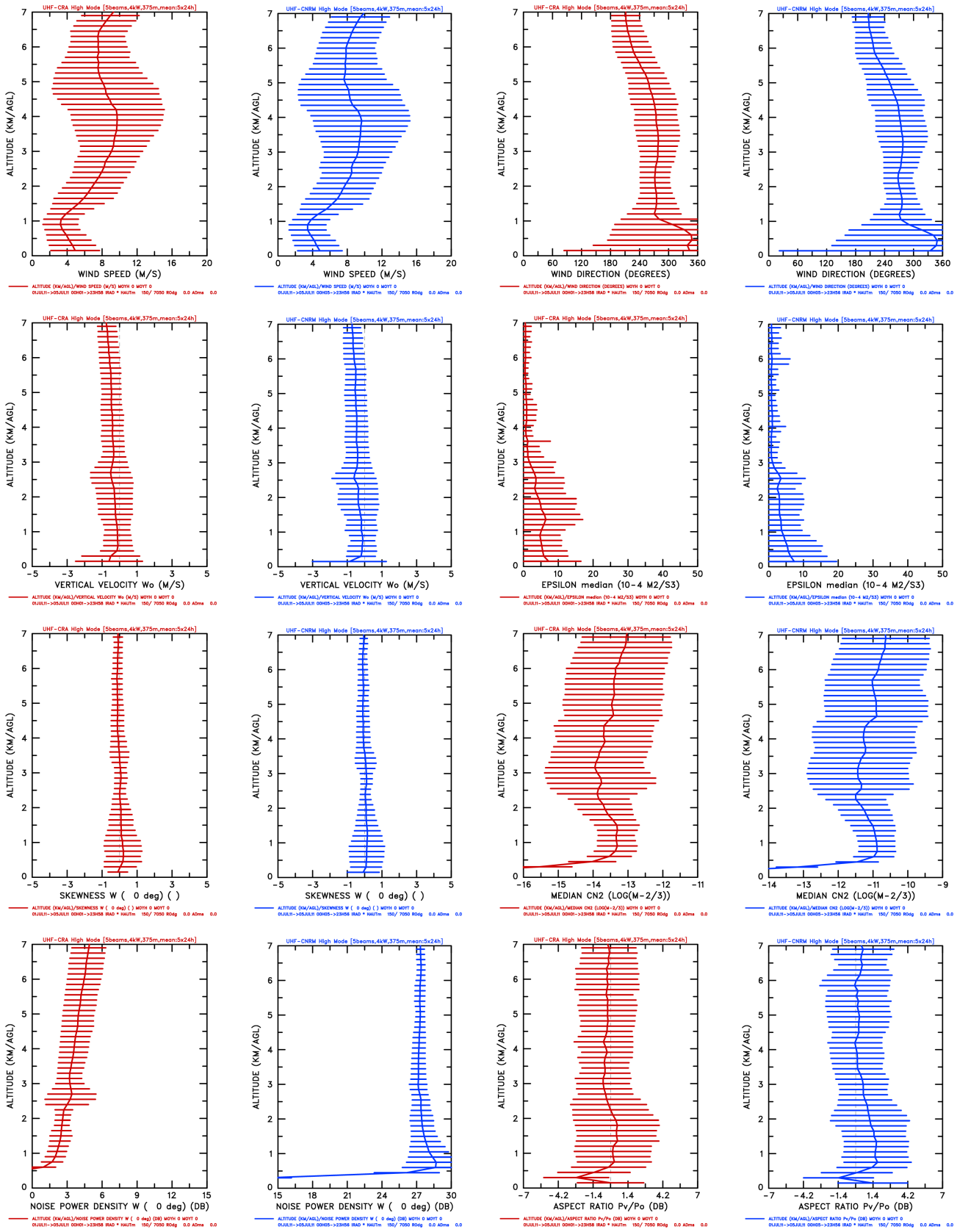


Figure 5: **Second period: high mode with (red) site 1, (blue) site 2**

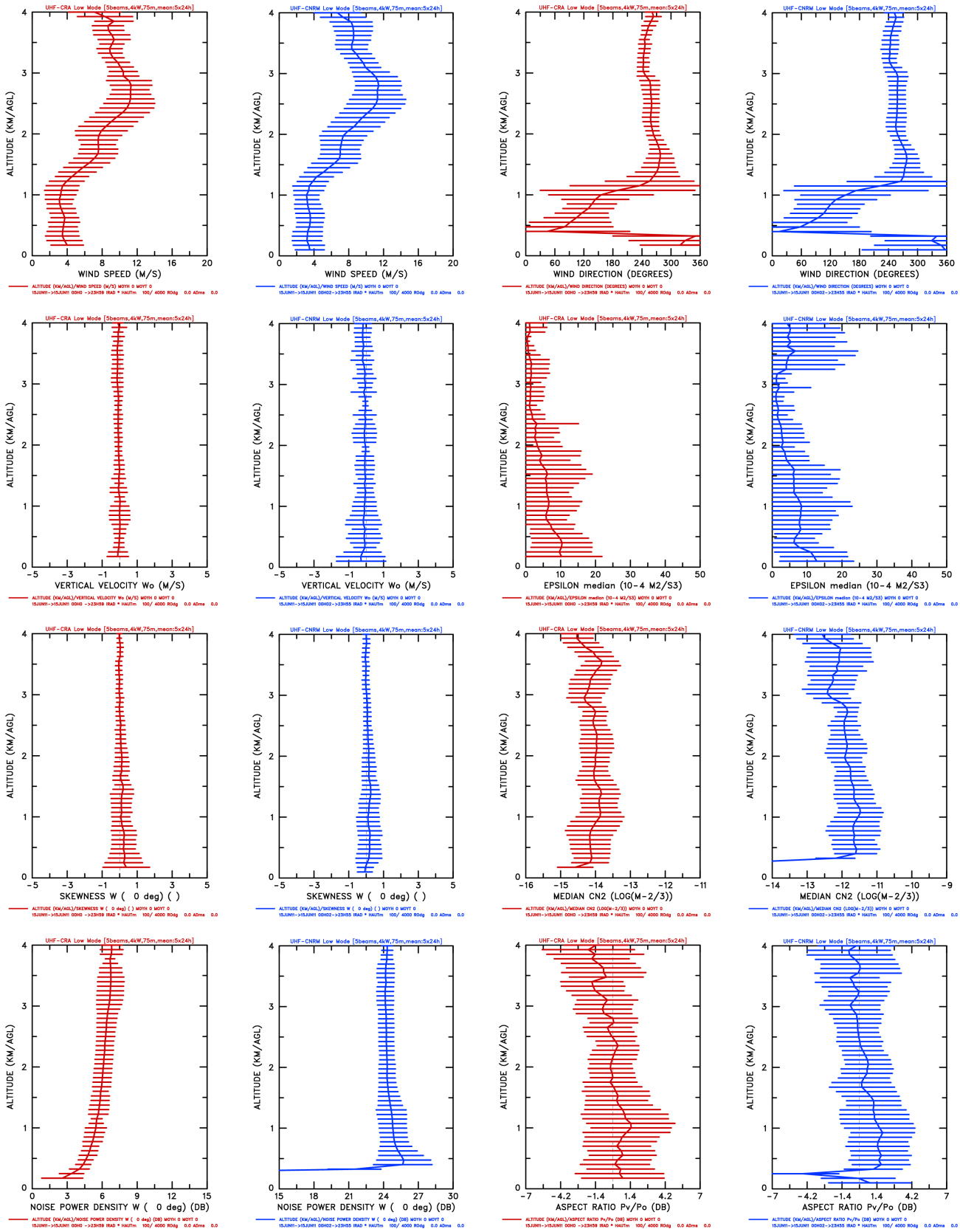


Figure 6: **IOP 1: 2011/06/15 low mode with (red) site 1, (blue) site 2**

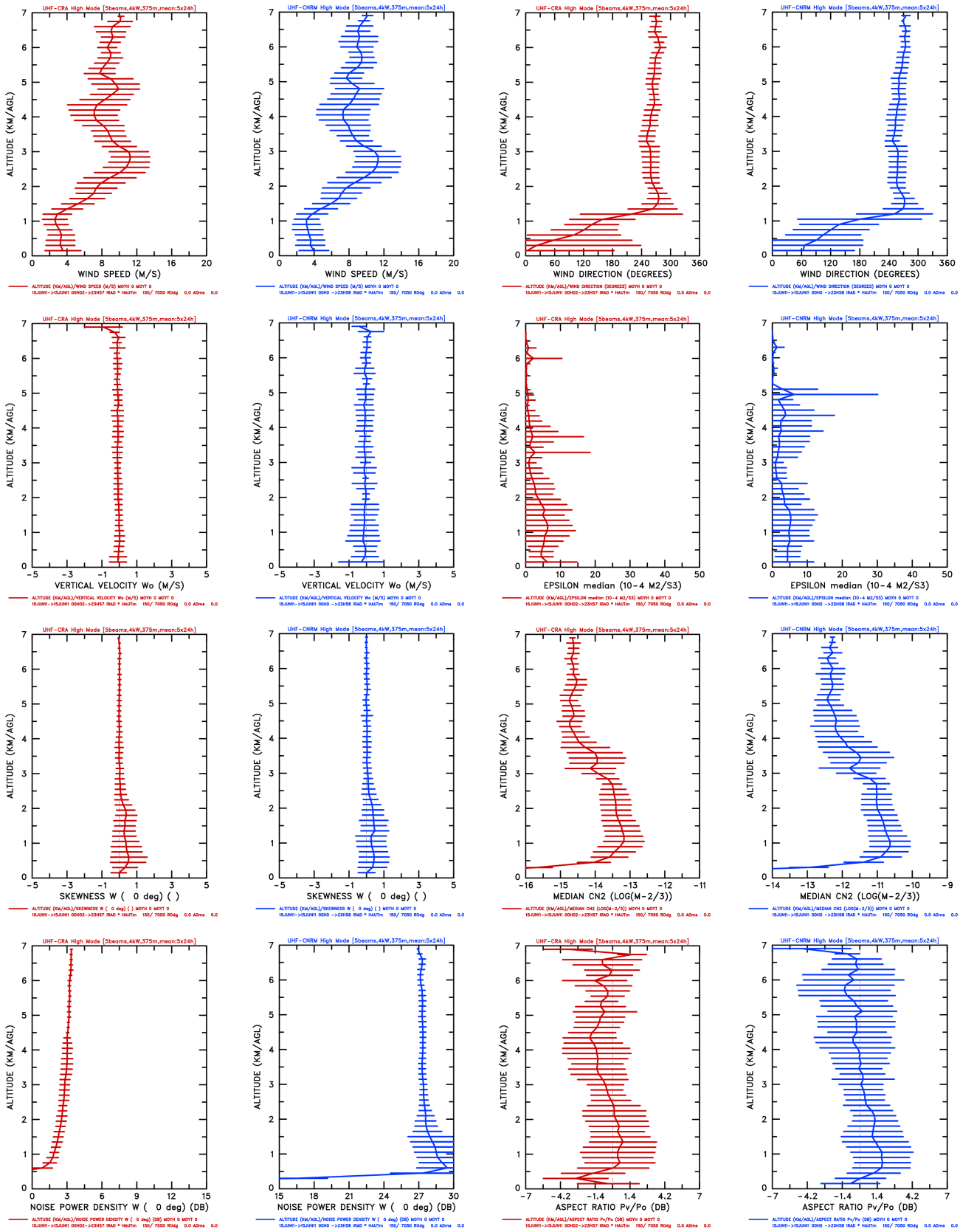


Figure 7: **IOP 1: 2011/06/15 high mode with (red) site 1, (blue) site 2**

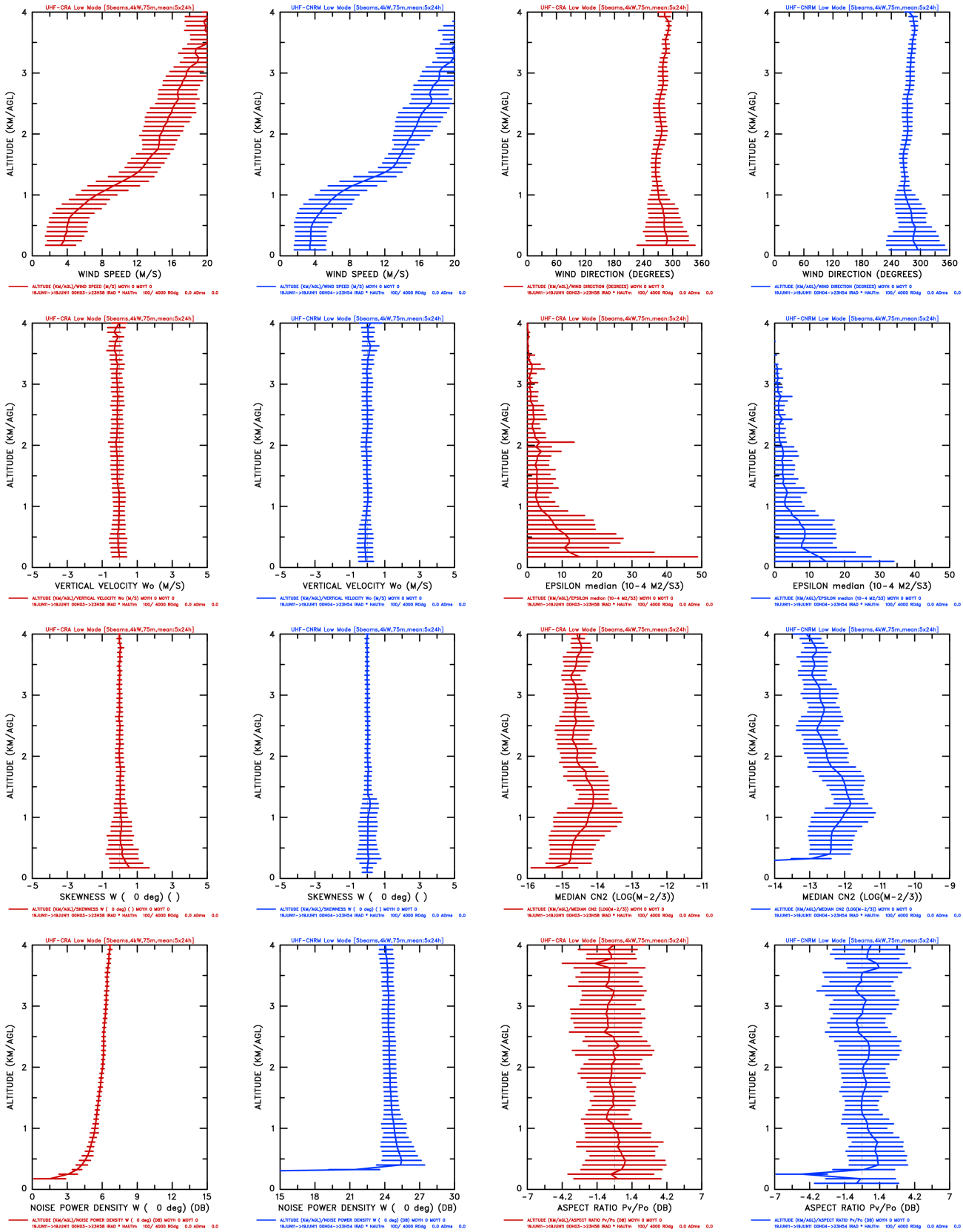


Figure 8: **IOP 2: 2011/06/19 low mode with (red) site 1, (blue) site 2**

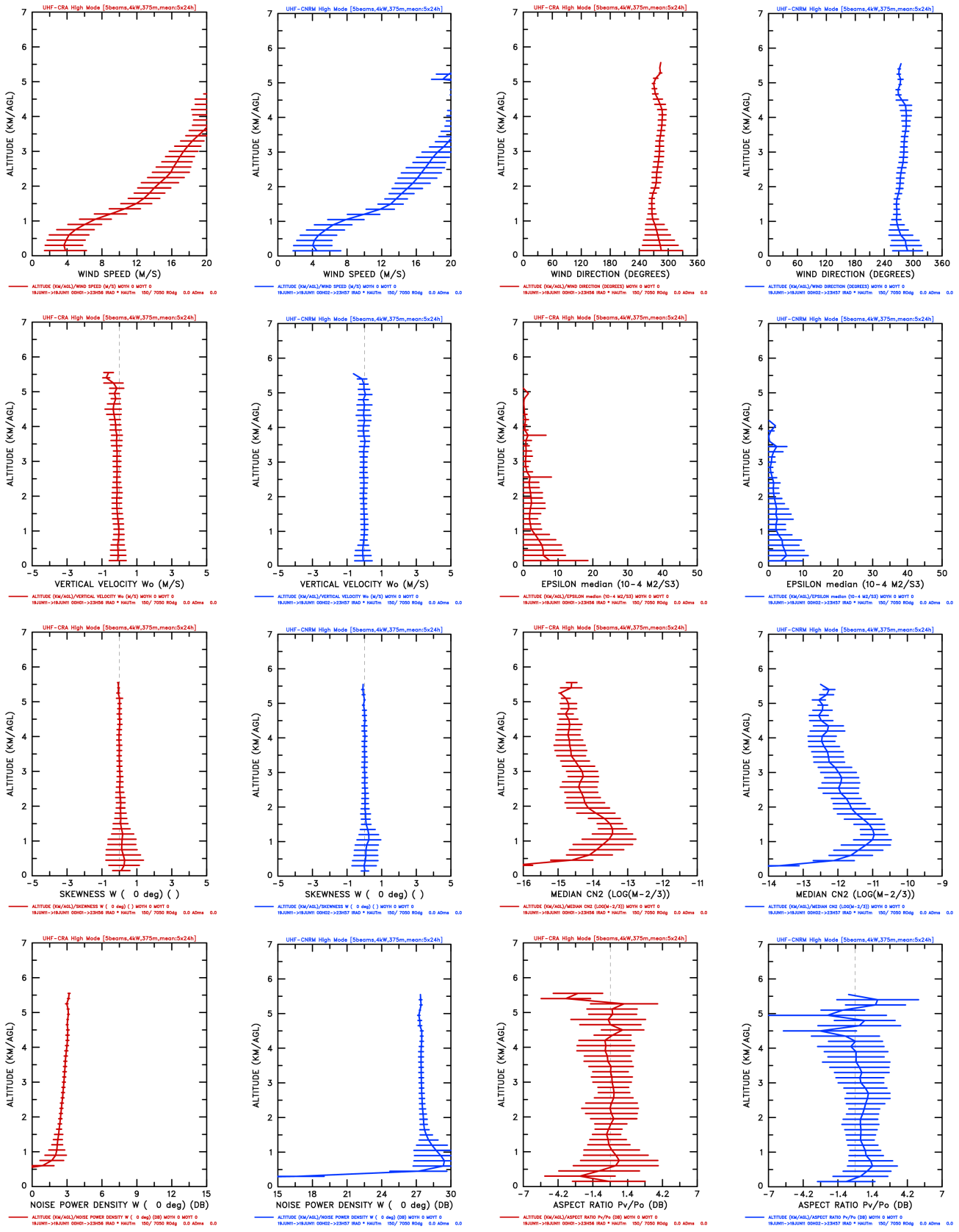


Figure 9: **IOP 2: 2011/06/19 high mode with (red) site 1, (blue) site 2**

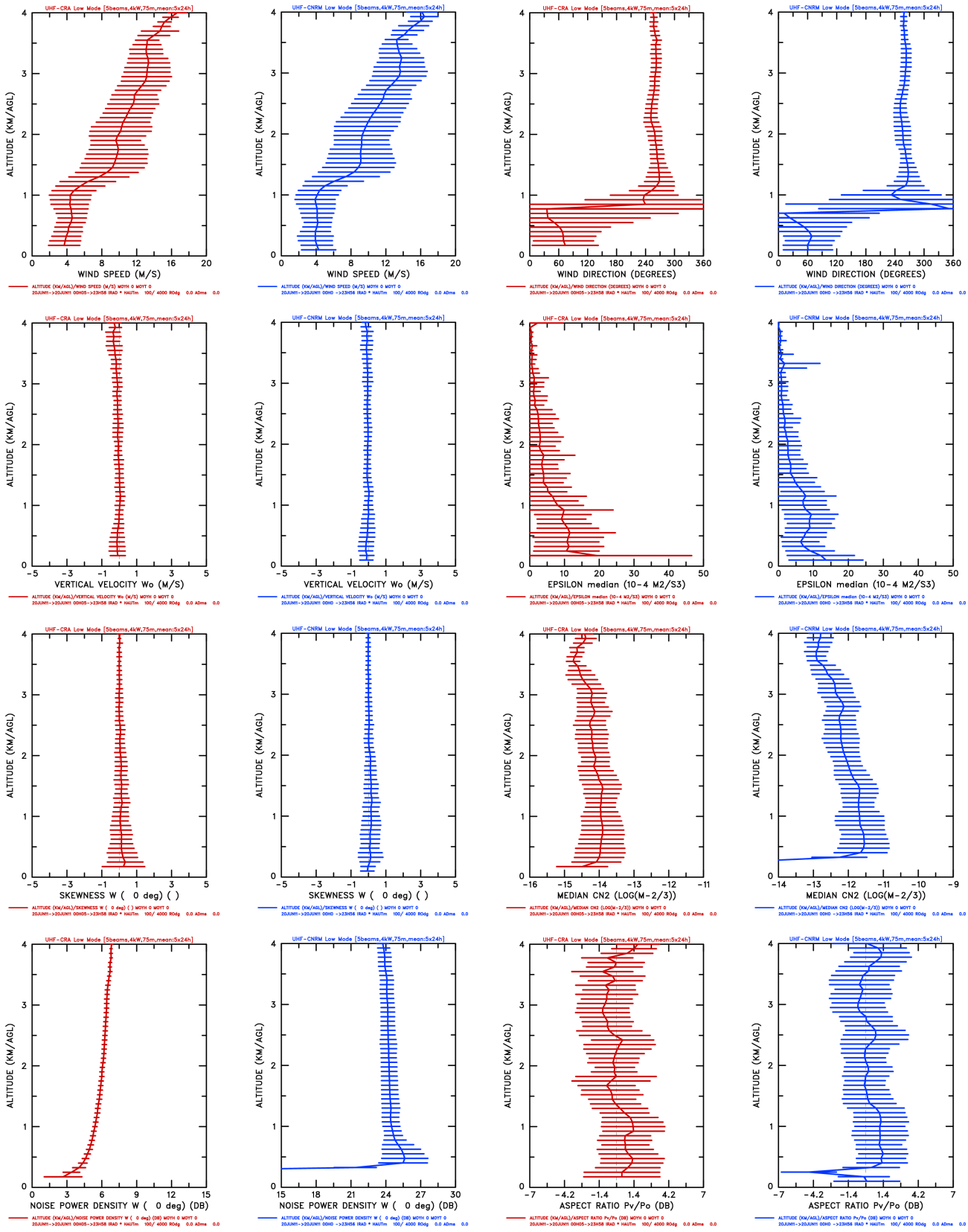


Figure 10: **IOP 3: 2011/06/20 low mode with (red) site 1, (blue) site 2**

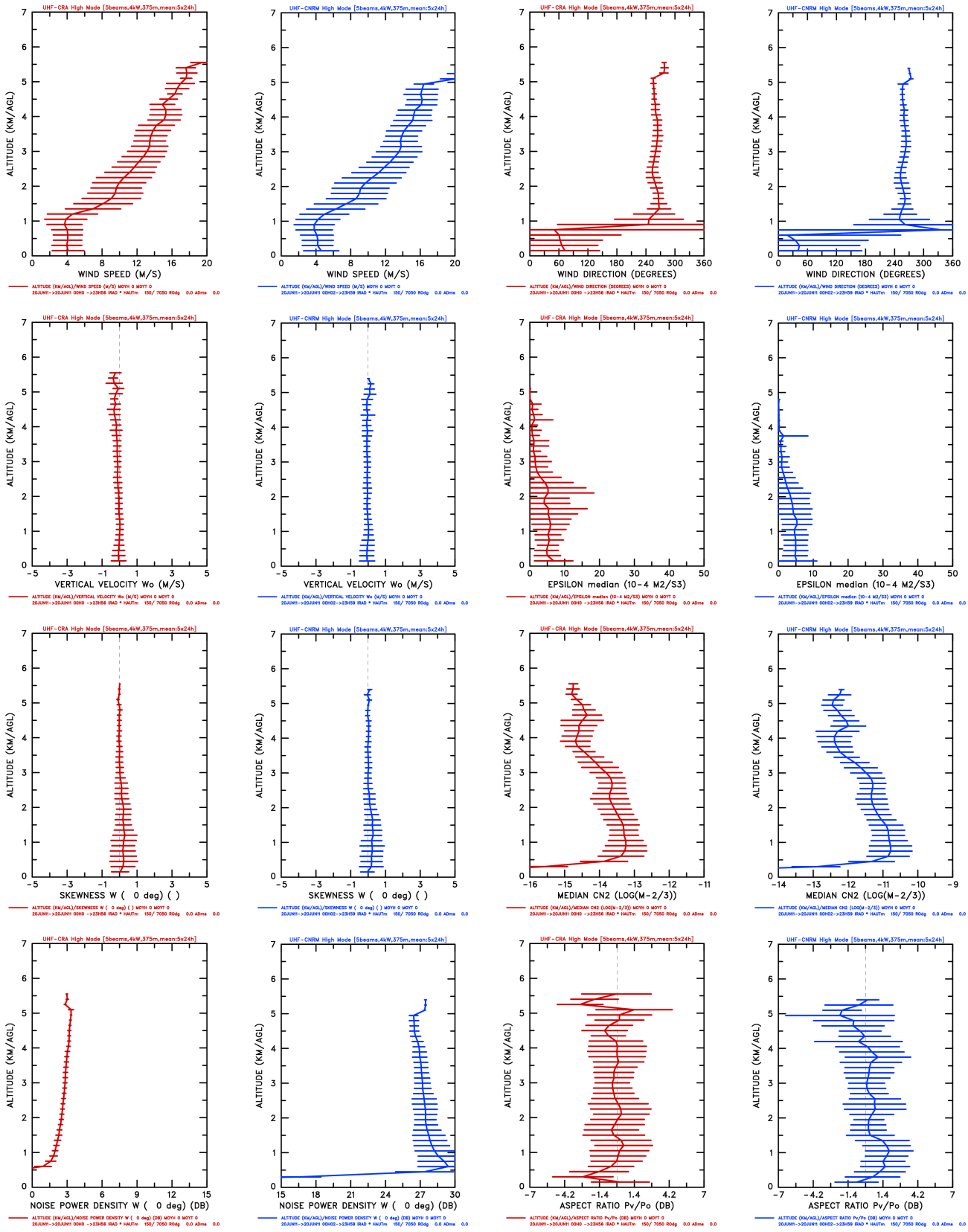


Figure 11: **IOP 3: 2011/06/20 high mode with (red) site 1, (blue) site 2**

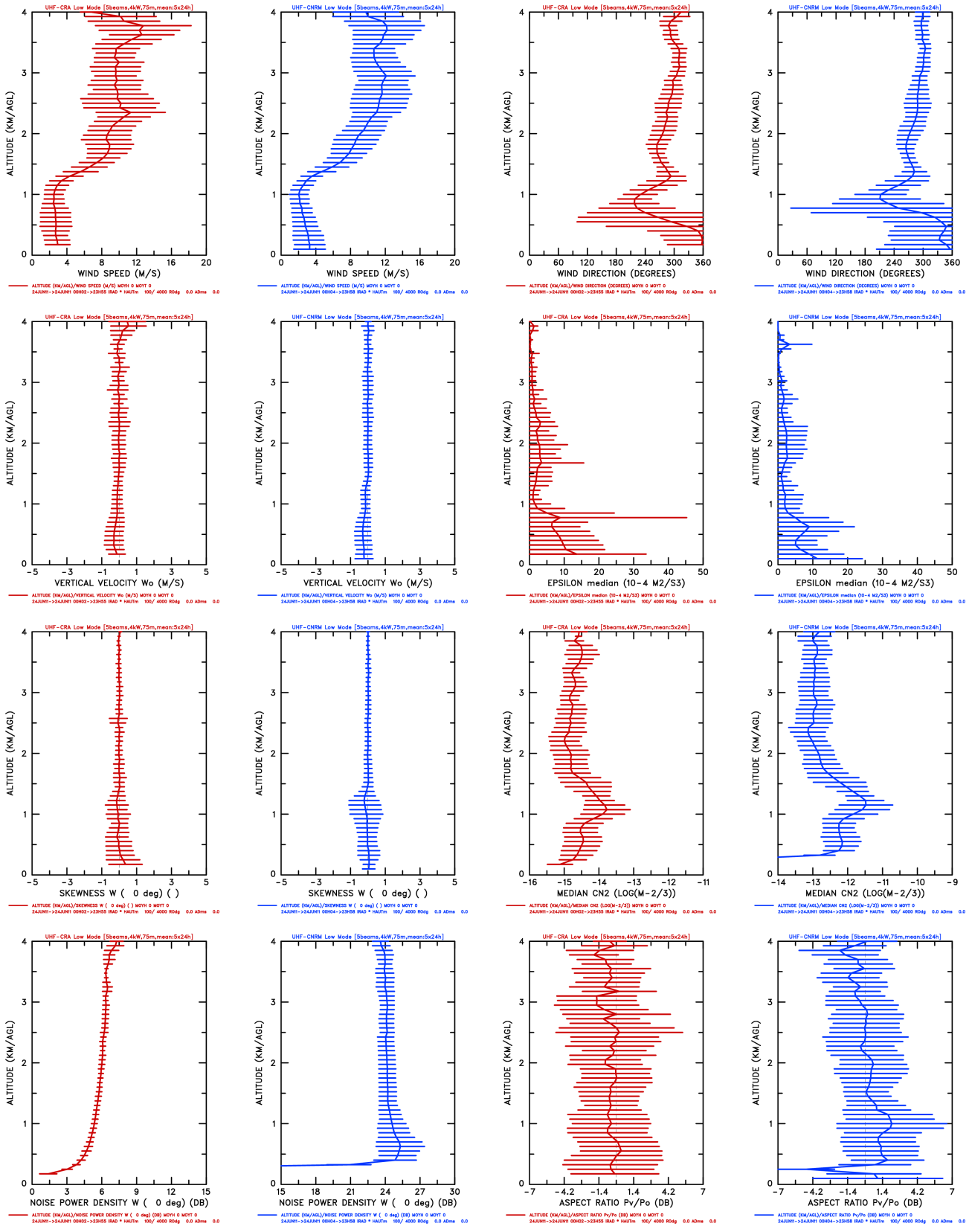


Figure 12: **IOP 4: 2011/06/24 low mode with (red) site 1, (blue) site 2**

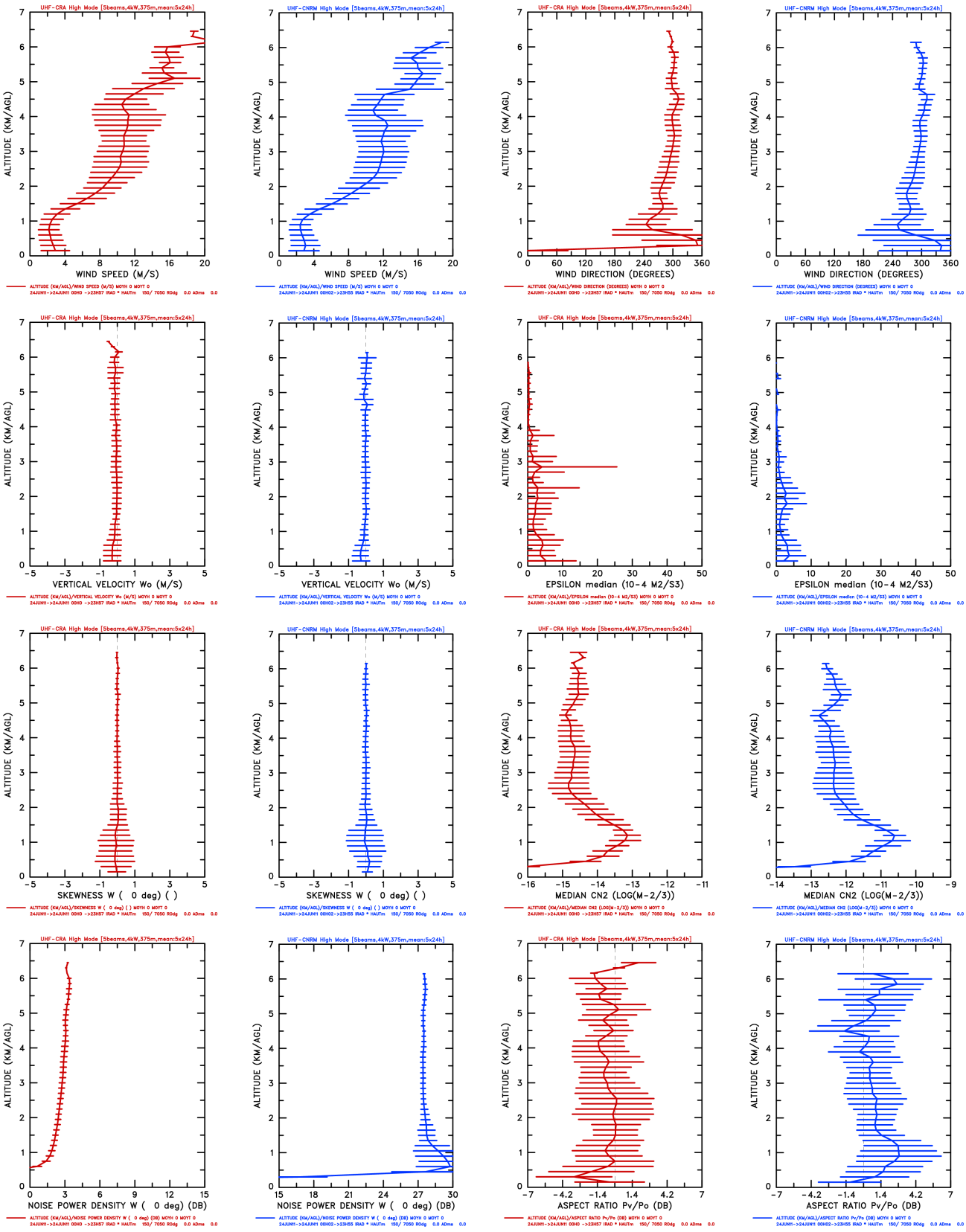


Figure 13: **IOP 4: 2011/06/24 high mode with (red) site 1, (blue) site 2**

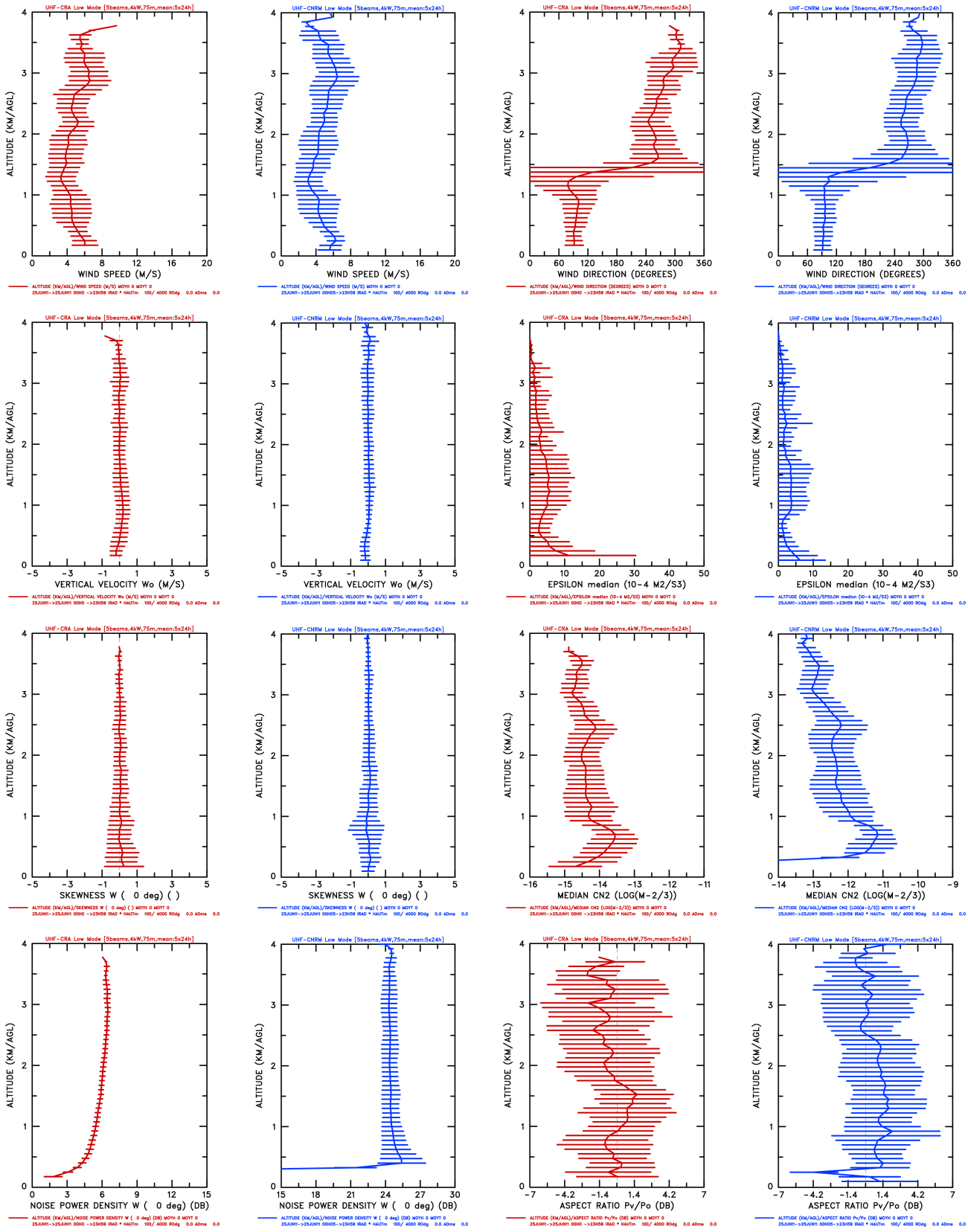


Figure 14: **IOP 5: 2011/06/25 low mode with (red) site 1, (blue) site 2**

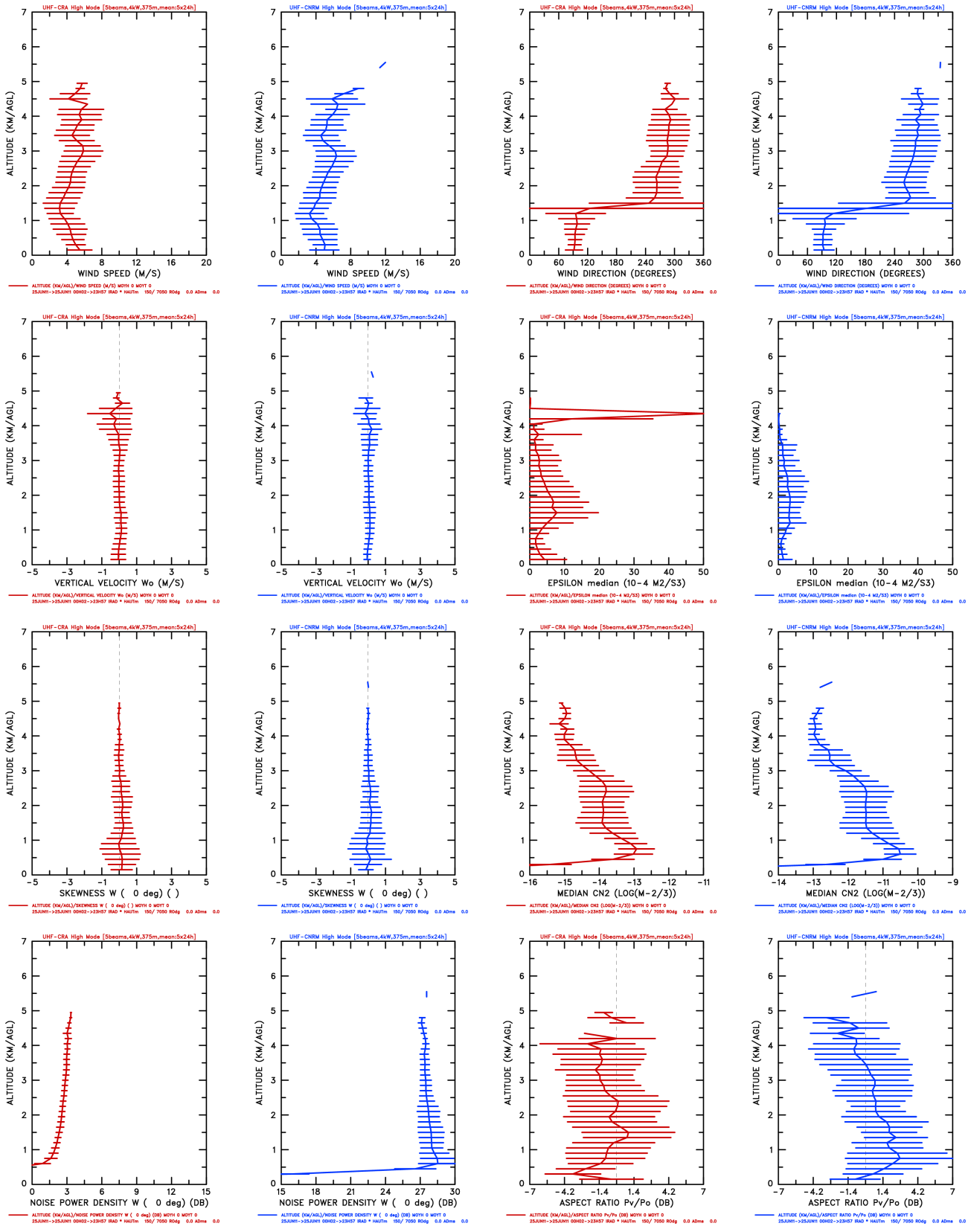


Figure 15: **IOP 5: 2011/06/25 high mode with (red) site 1, (blue) site 2**

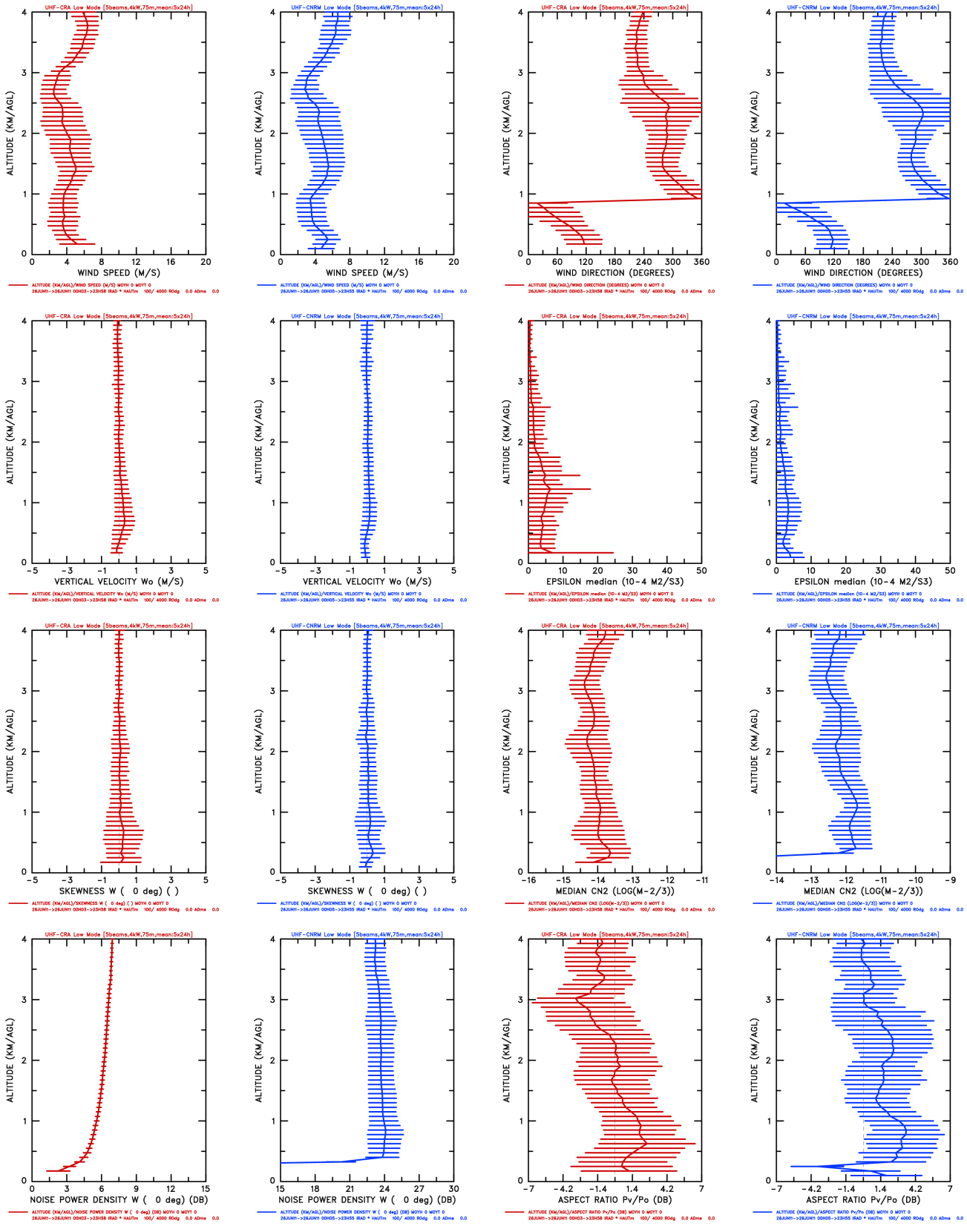


Figure 16: **IOP 6: 2011/06/26 low mode with (red) site 1, (blue) site 2**

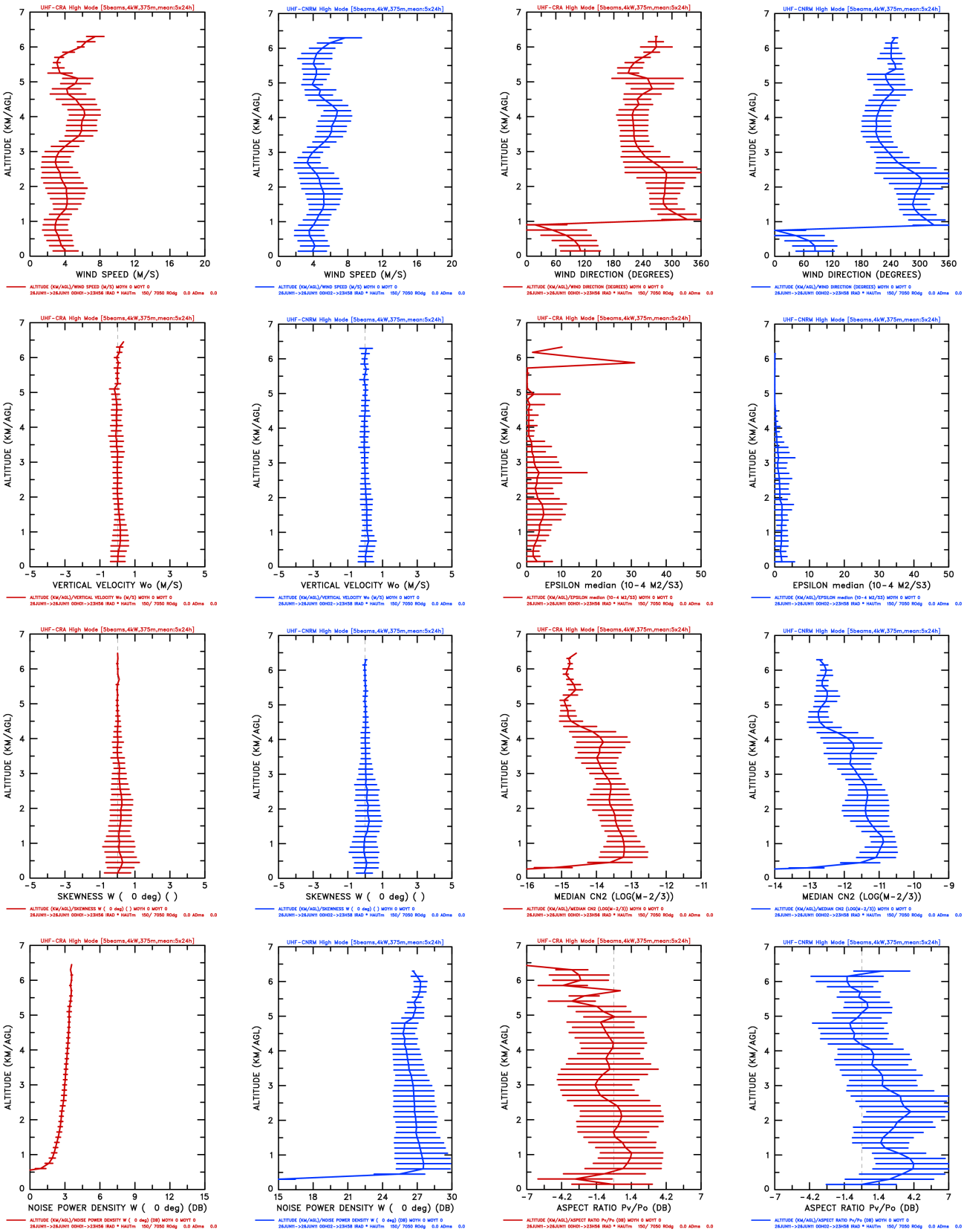


Figure 17: **IOP 6: 2011/06/26 high mode with (red) site 1, (blue) site 2**

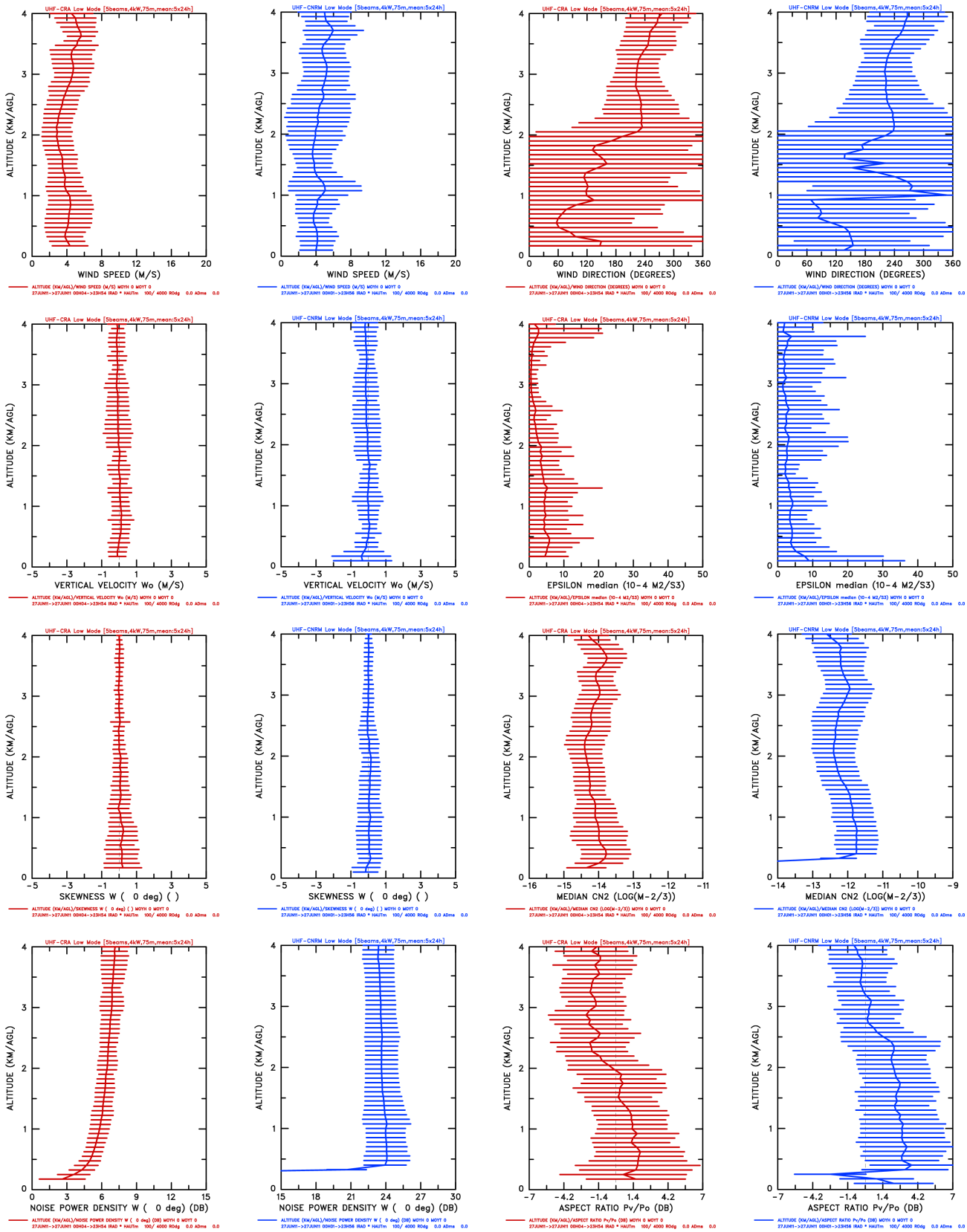


Figure 18: **IOP 7: 2011/06/27 low mode with (red) site 1, (blue) site 2**

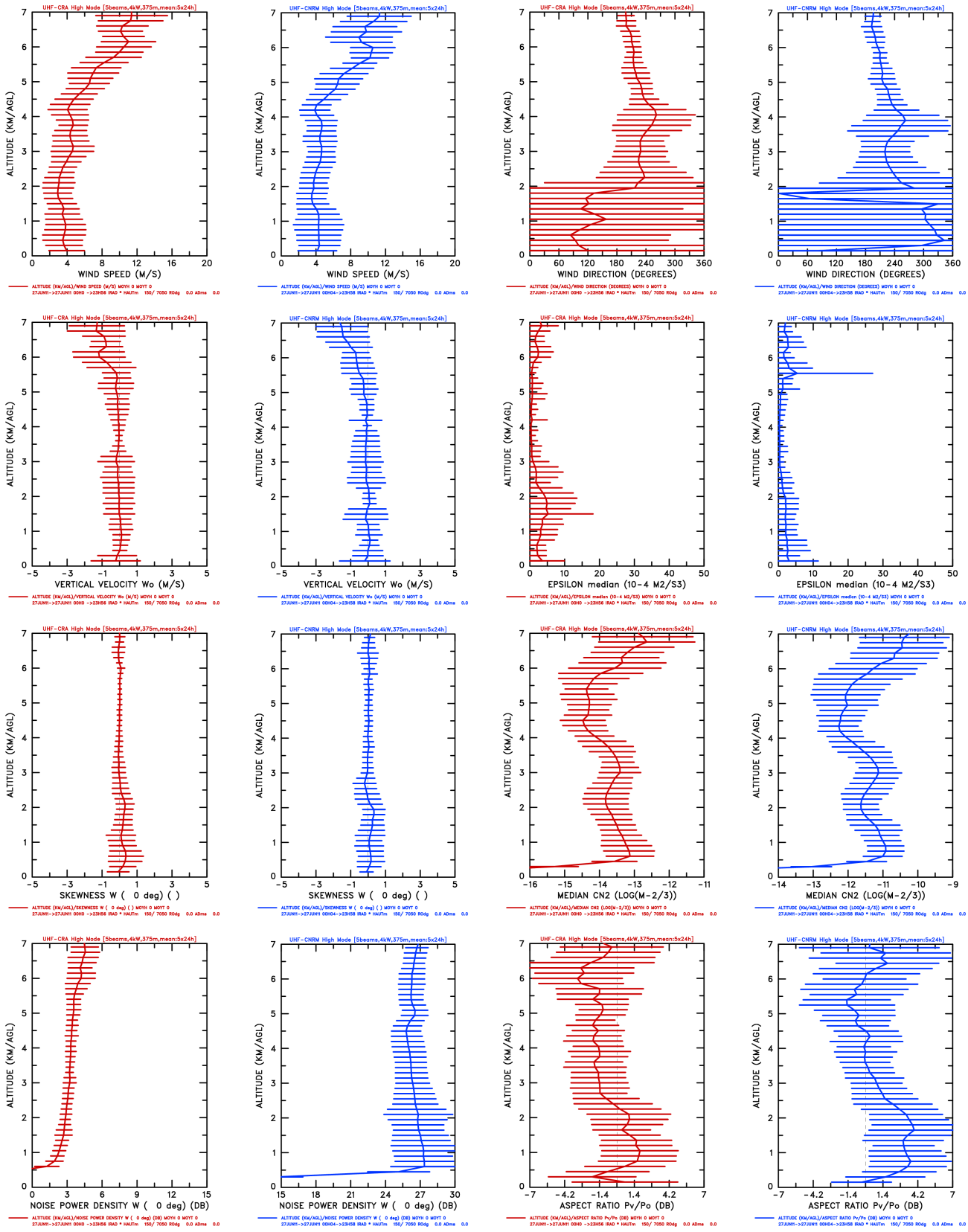


Figure 19: **IOP 7: 2011/06/27 high mode with (red) site 1, (blue) site 2**

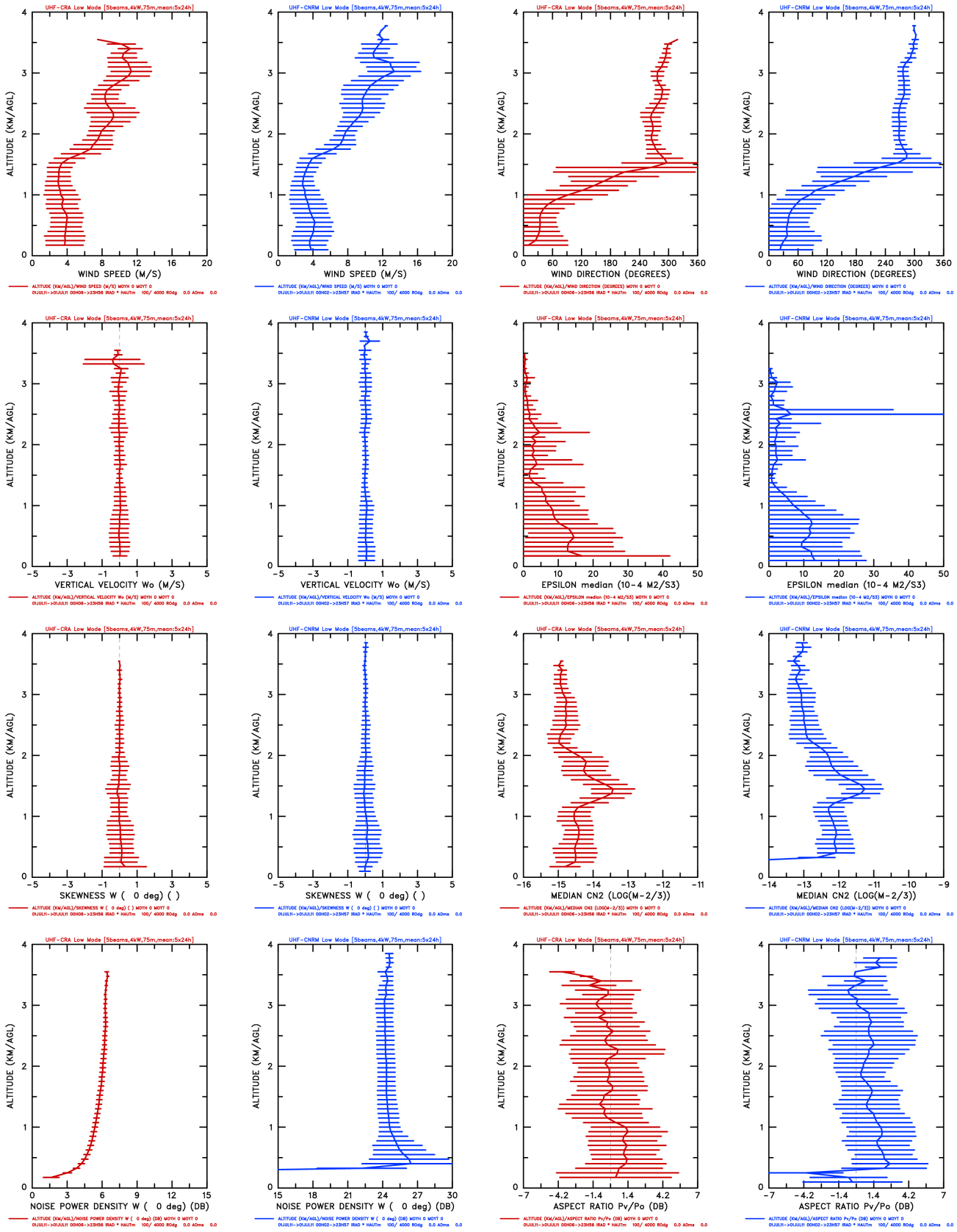


Figure 20: **IOP 9: 2011/07/01 low mode with (red) site 1, (blue) site 2**

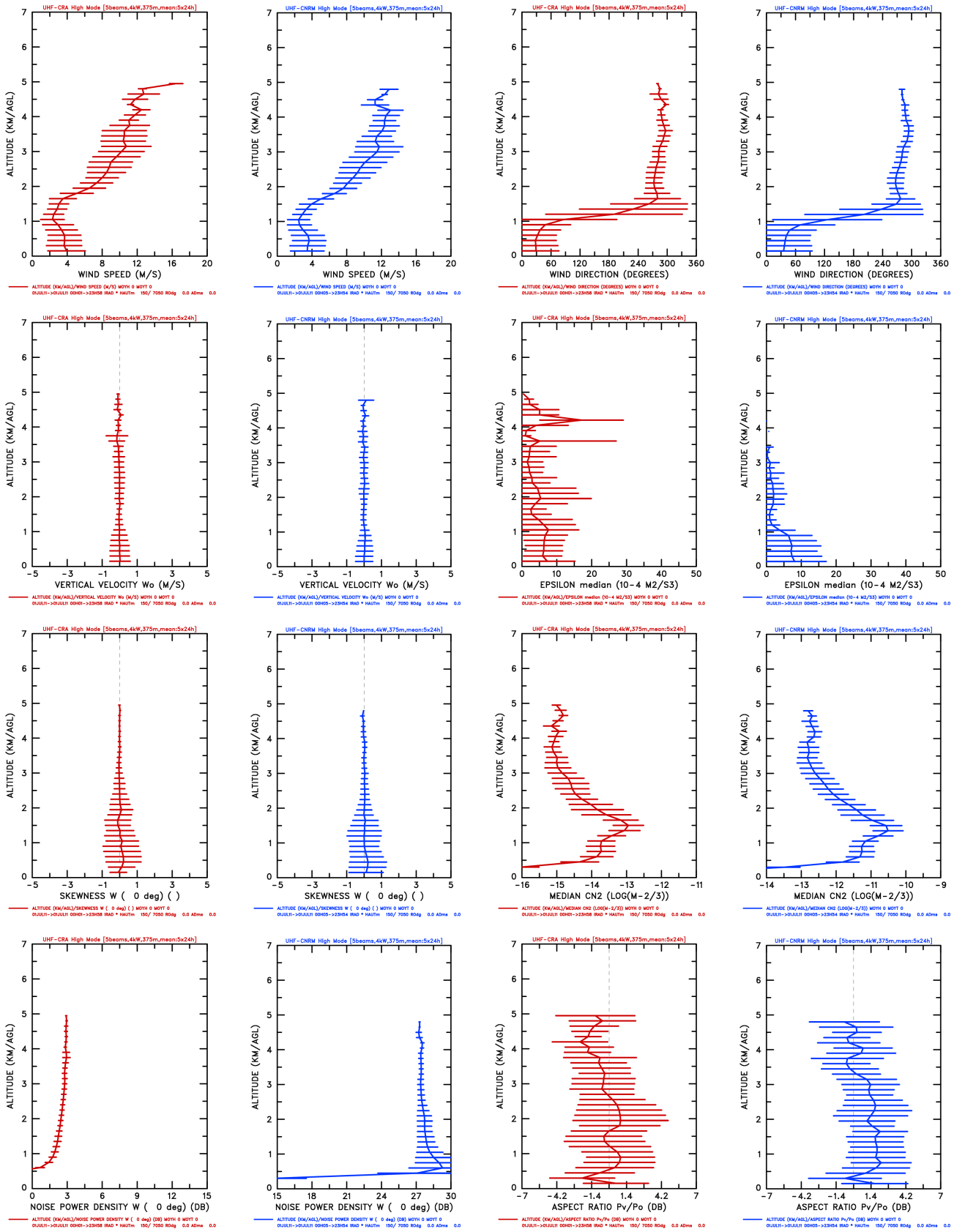


Figure 21: **IOP 9: 2011/07/01 high mode with (red) site 1, (blue) site 2**

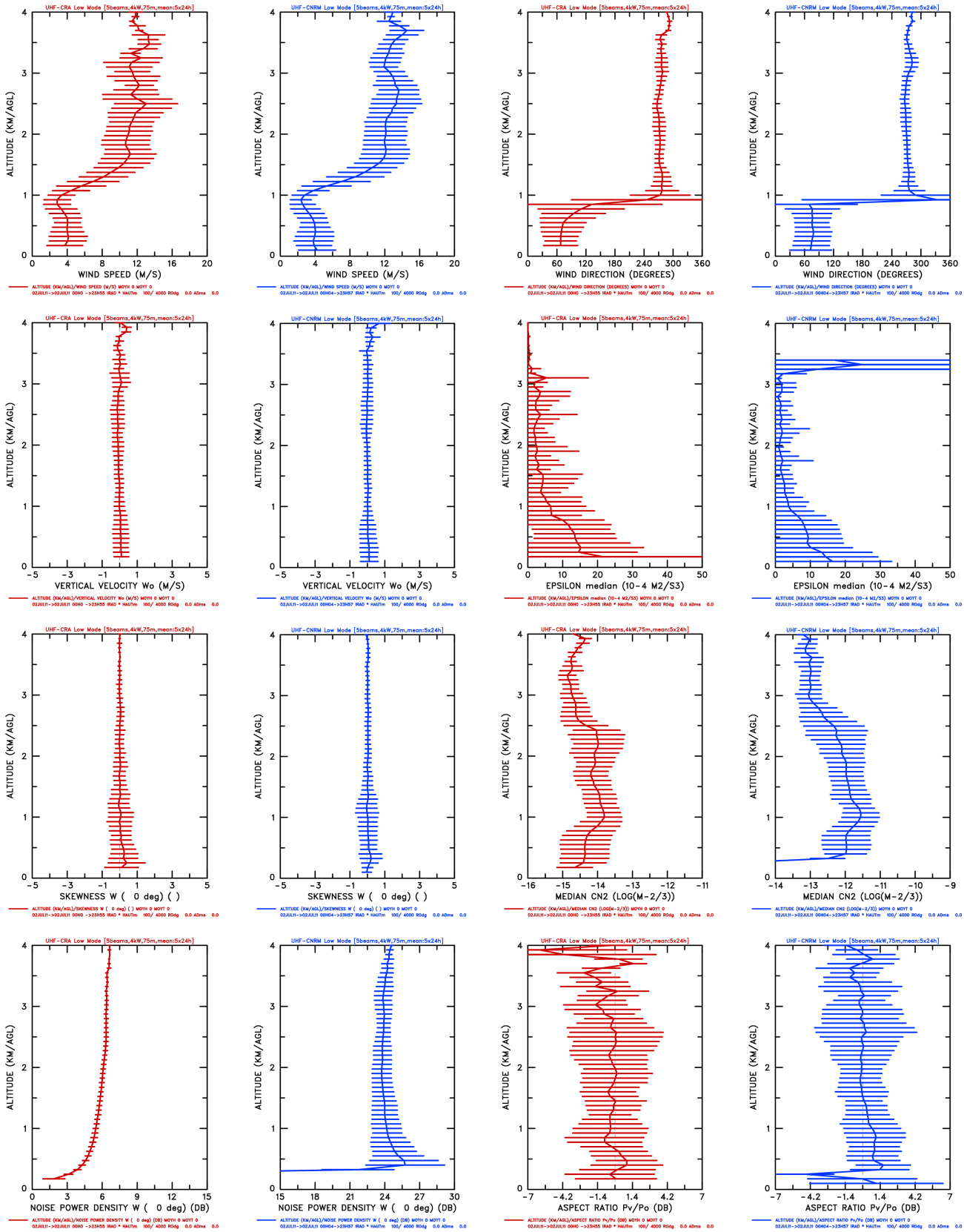


Figure 22: **IOP 10: 2011/07/02 low mode with (red) site 1, (blue) site 2**

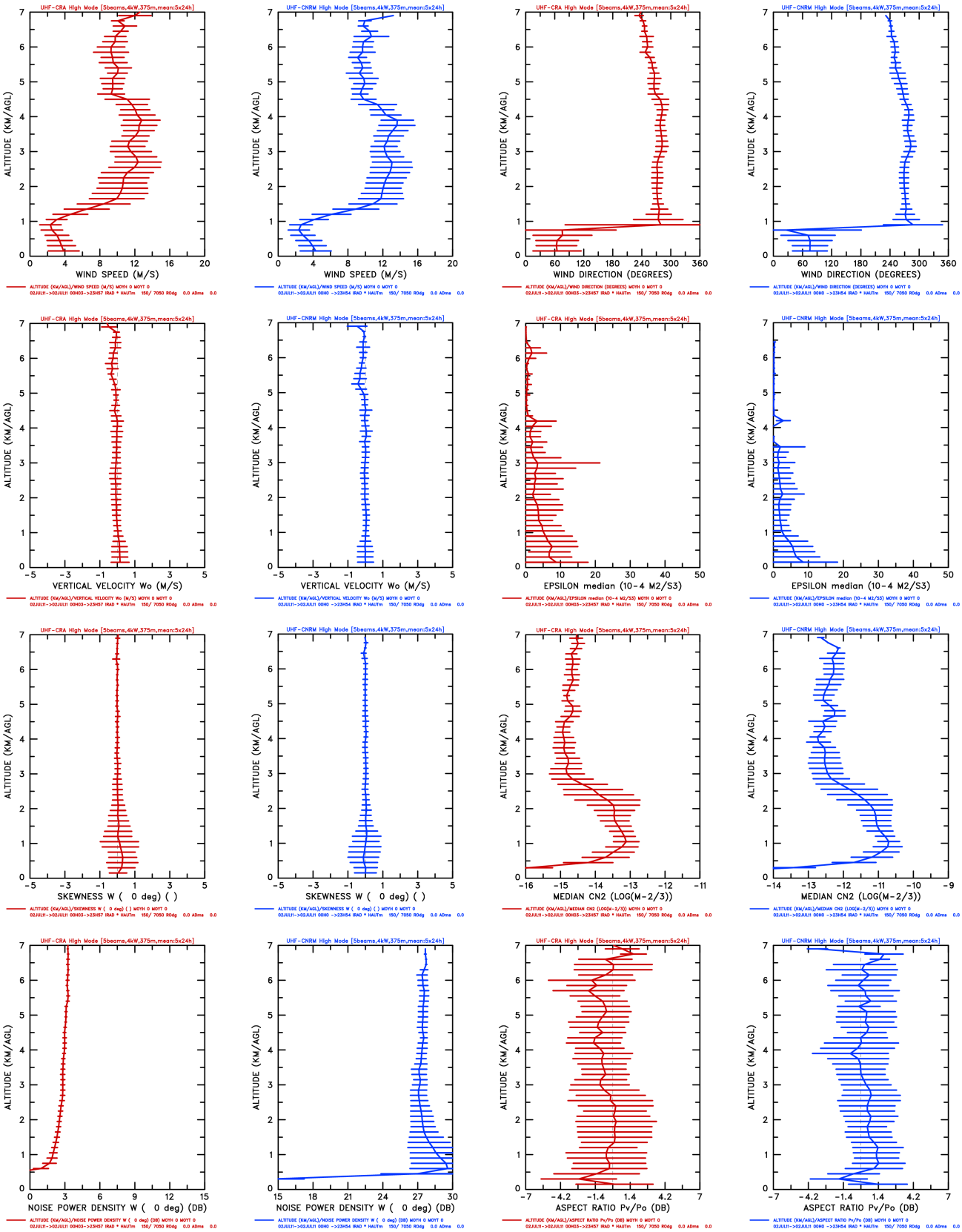


Figure 23: **IOP 10: 2011/07/02 high mode with (red) site 1, (blue) site 2**

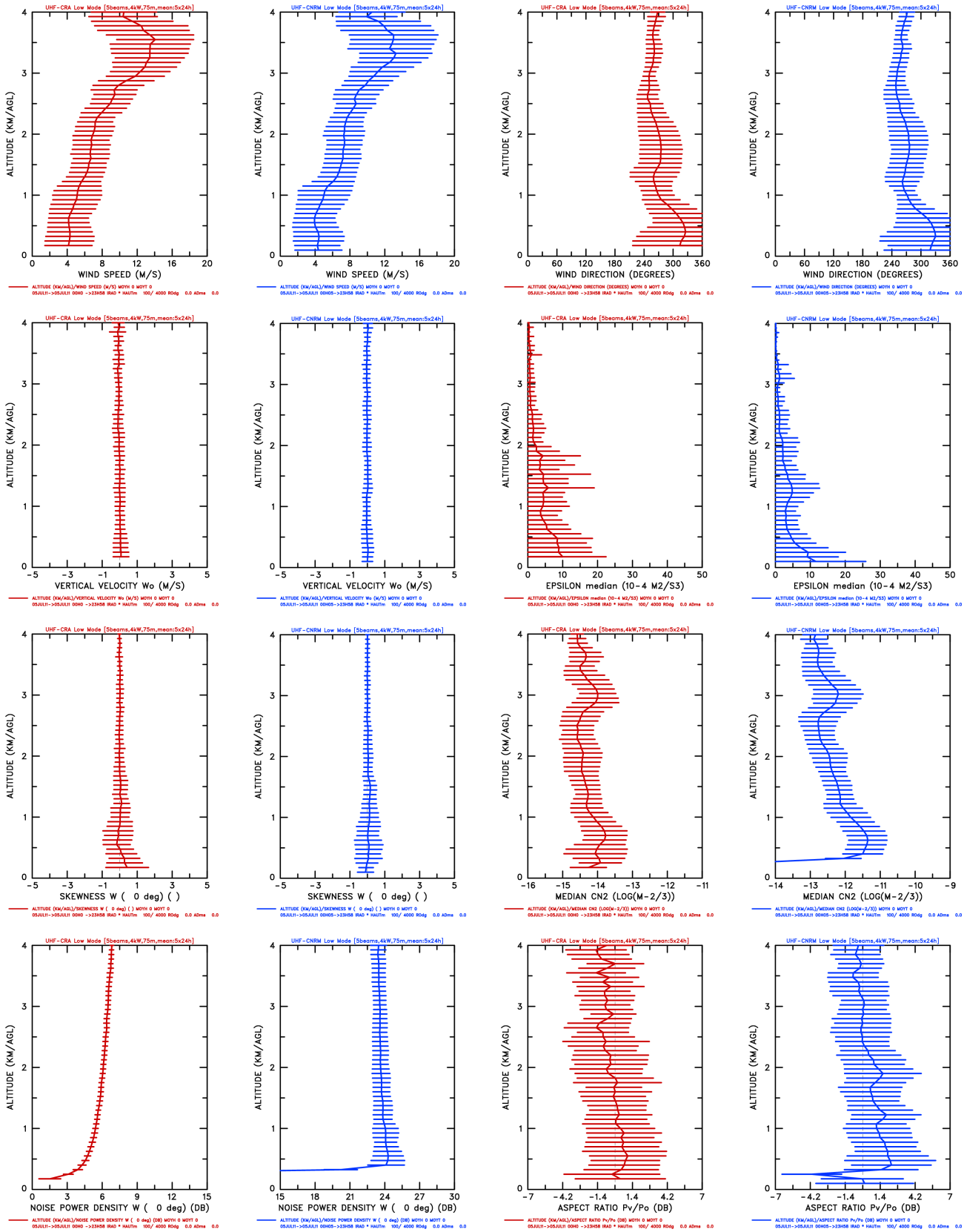


Figure 24: **IOP 11: 2011/07/05 low mode with (red) site 1, (blue) site 2**

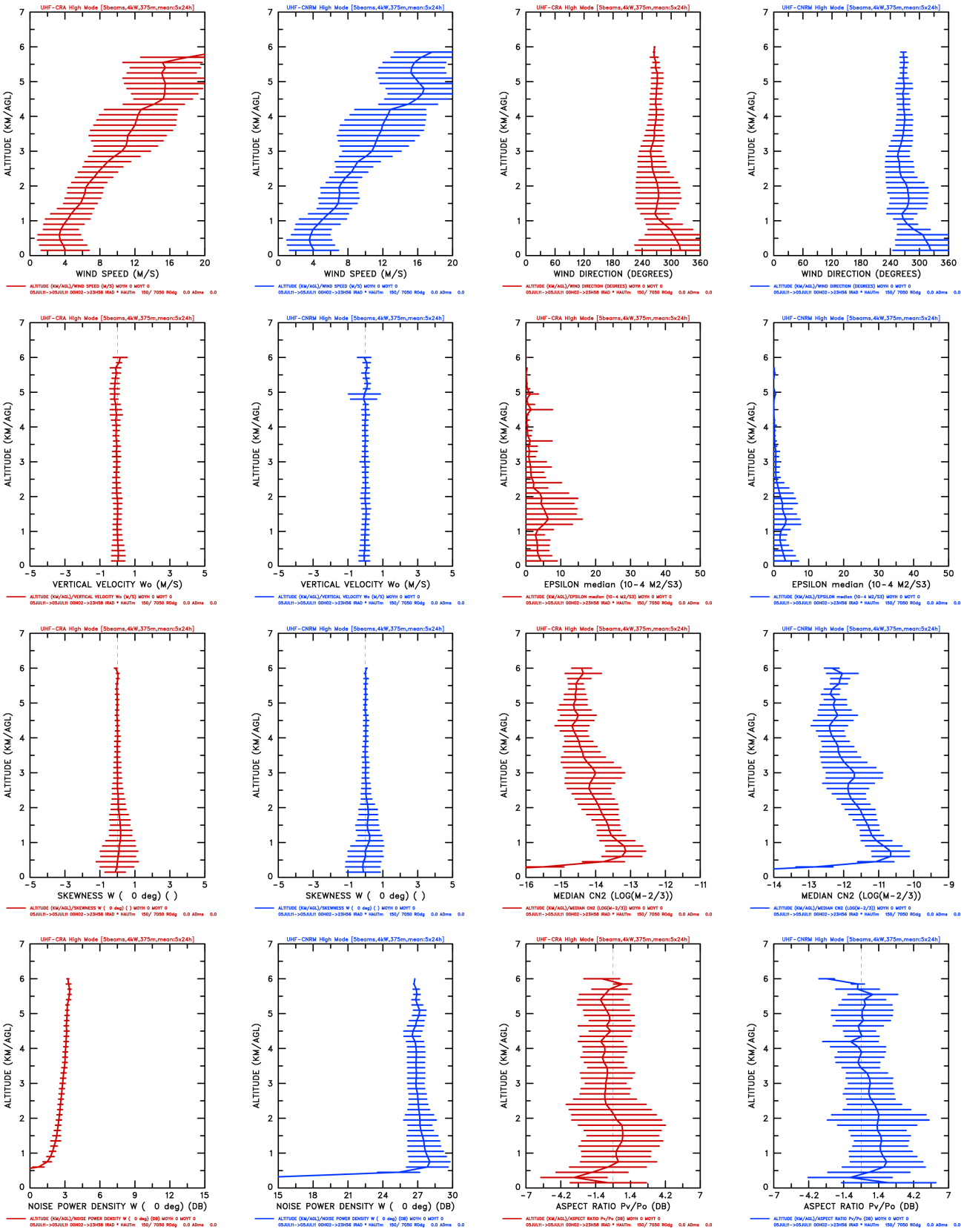


Figure 25: **IOP 11: 2011/07/05 high mode with (red) site 1, (blue) site 2**