Evidence that the Great Siberian Impact was Due to a Comet

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Trees knocked over by the Tunguska blast. Photograph from Kulik's 1927 expedition.

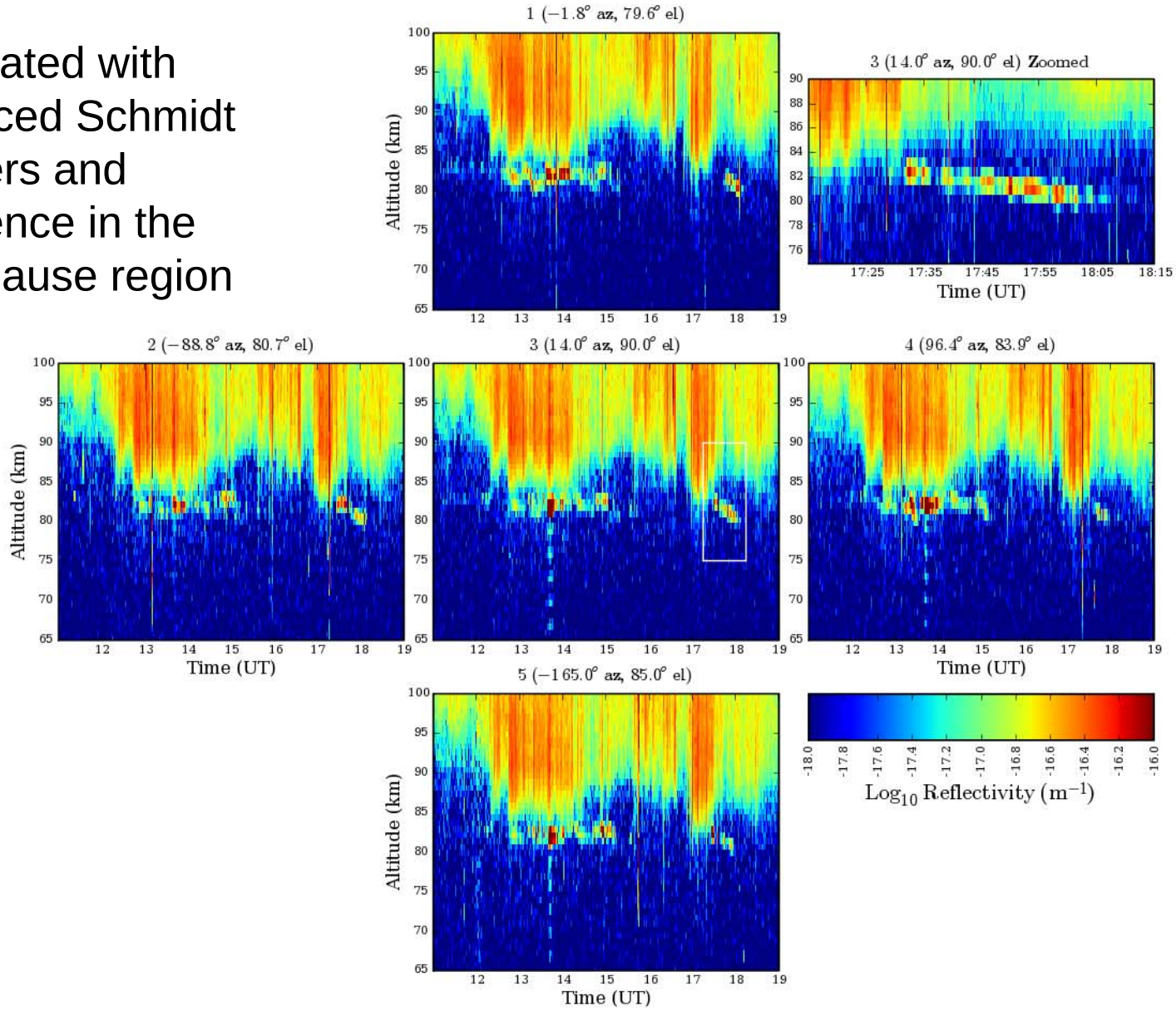
30th June: " Suddenly, after 10 p.m. (G.M.T.) a sheet of cirro-stratus appeared in the NNW, making it seem, by the sun's reflection, almost as bright as daylight."

1st July: 10 p.m.—" trace of cirrus from west—extremely light night."

Now these were quite unbiased entries—I had no idea, naturally, of any possible cause—but the most interesting part of the above entry is that of June 30, ' Suddenly after 10 p.m. . . . ' I recall that I was at work that evening at the Observatory and had been making some tabulations about 10 p.m. and could just see the measuring scale divisions and no more—then it seemed suddenly to become much lighter and I saw the scale divisions quite clearly. I wondered what had happened, and I remember I took the Fineman nephoscope on to the roof of the tower and polarised the light of the sky in the black mirror. To the eye itself the sky appeared merely whitish blue, but in the mirror I clearly saw some faint web-like ci.-st. and I surmised it might be an unusually high sheet of this, which had caught the rays (perhaps refracted and/or reflected) of the sun which had set some two hours earlier. But the main point was the suddenness of the occurrence."

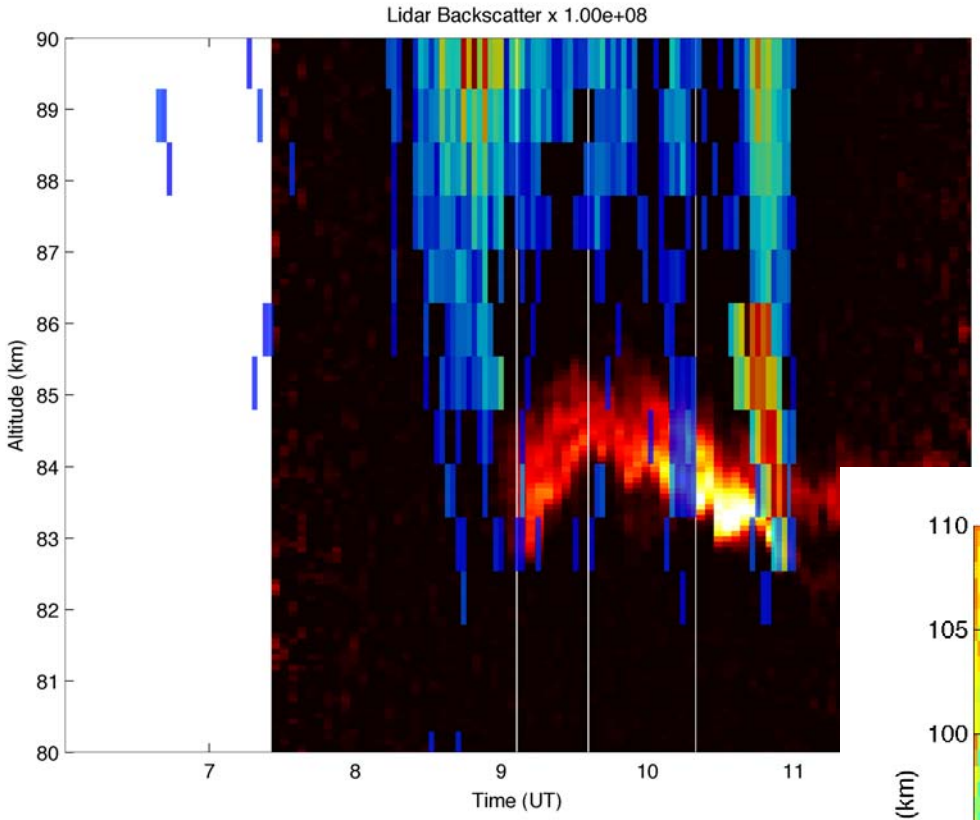
PMSE with PFISR

Associated with enhanced Schmidt numbers and turbulence in the mesopause region

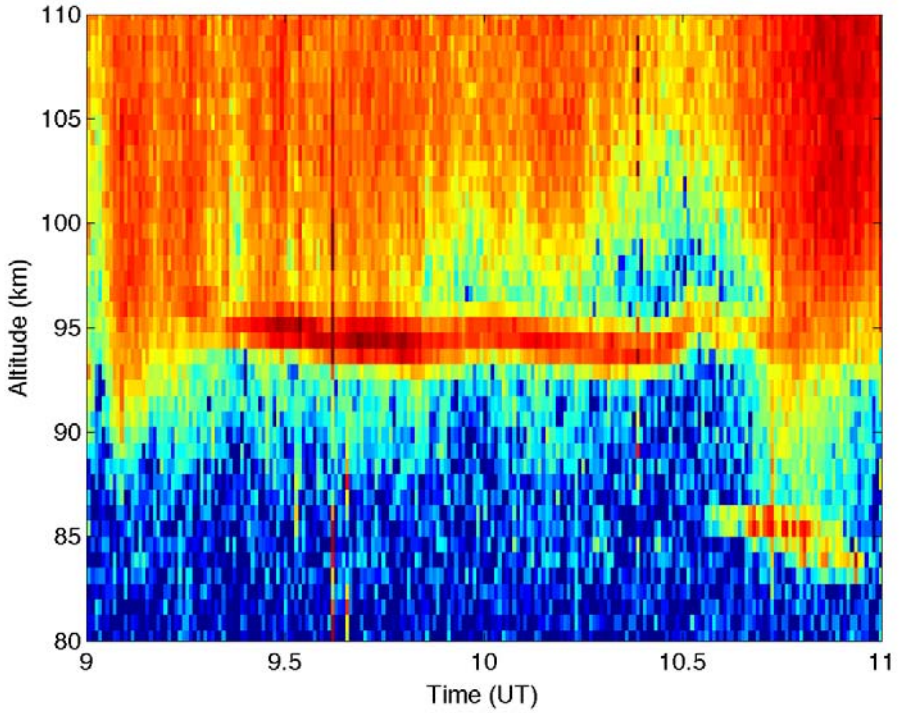


Photograph of noctilucent clouds taken from Donnelley Dome near Fairbanks, Alaska, looking toward the northwest with a wide-angle lens.

Similar Observations in 2007 - 4

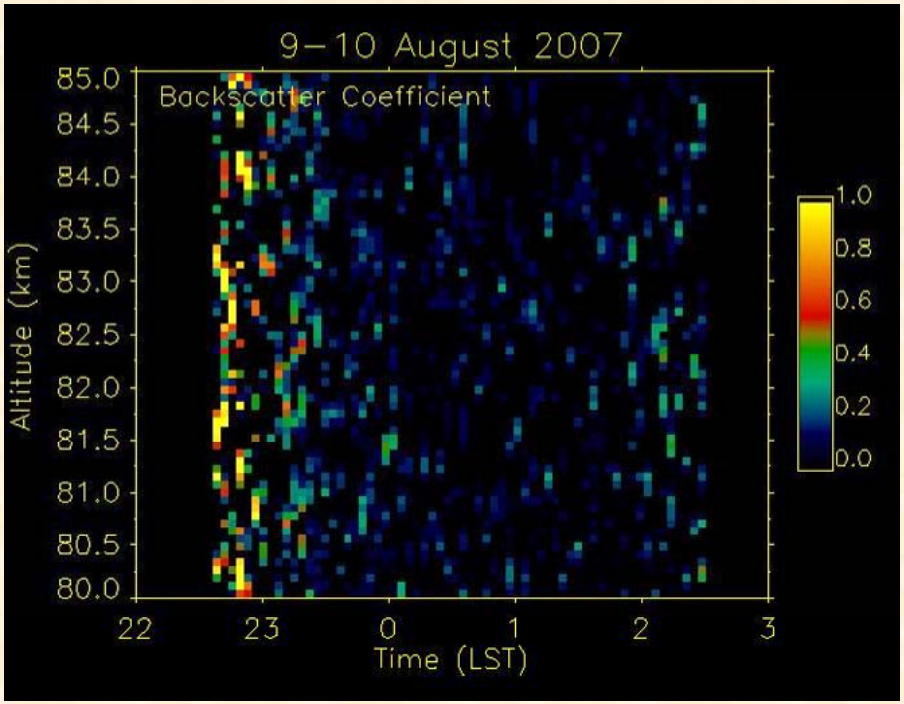


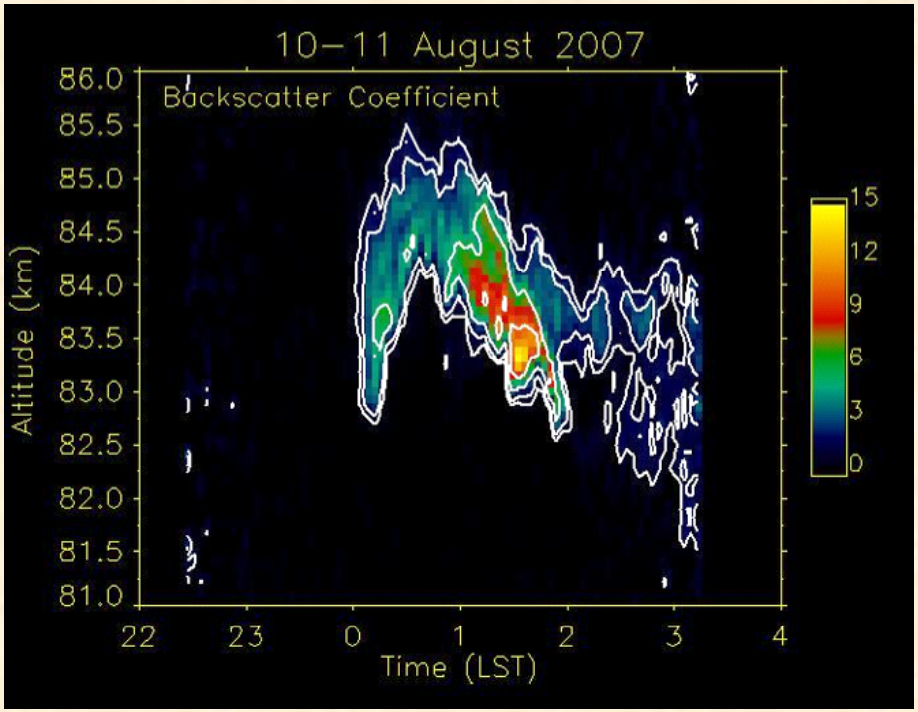
In addition, PFISR observed PMSE associated with the NLC and a strong sporadic E layer associated with the iron enhancement at 95 km.



Similar Observations in 2007 - 2

Rayleigh lidar at PFRR also indicates an NLC display beginning on 11 August.



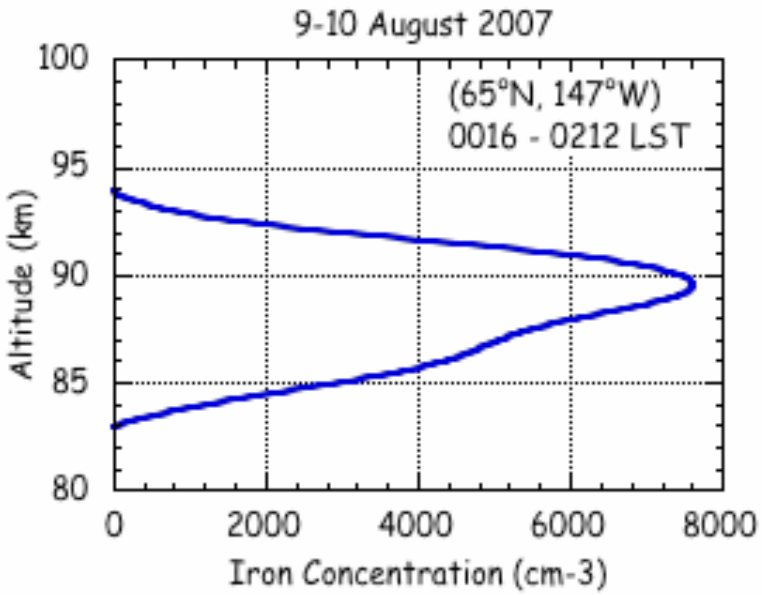


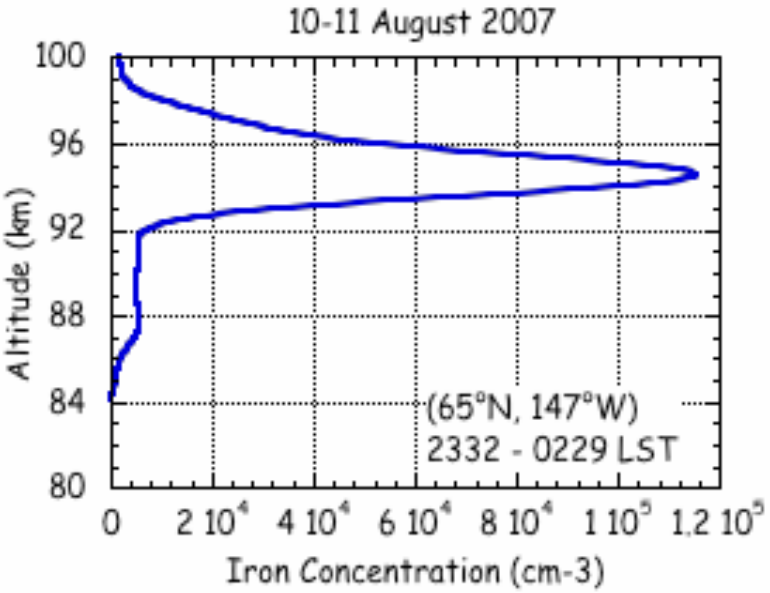
(Courtesy R. Collins)

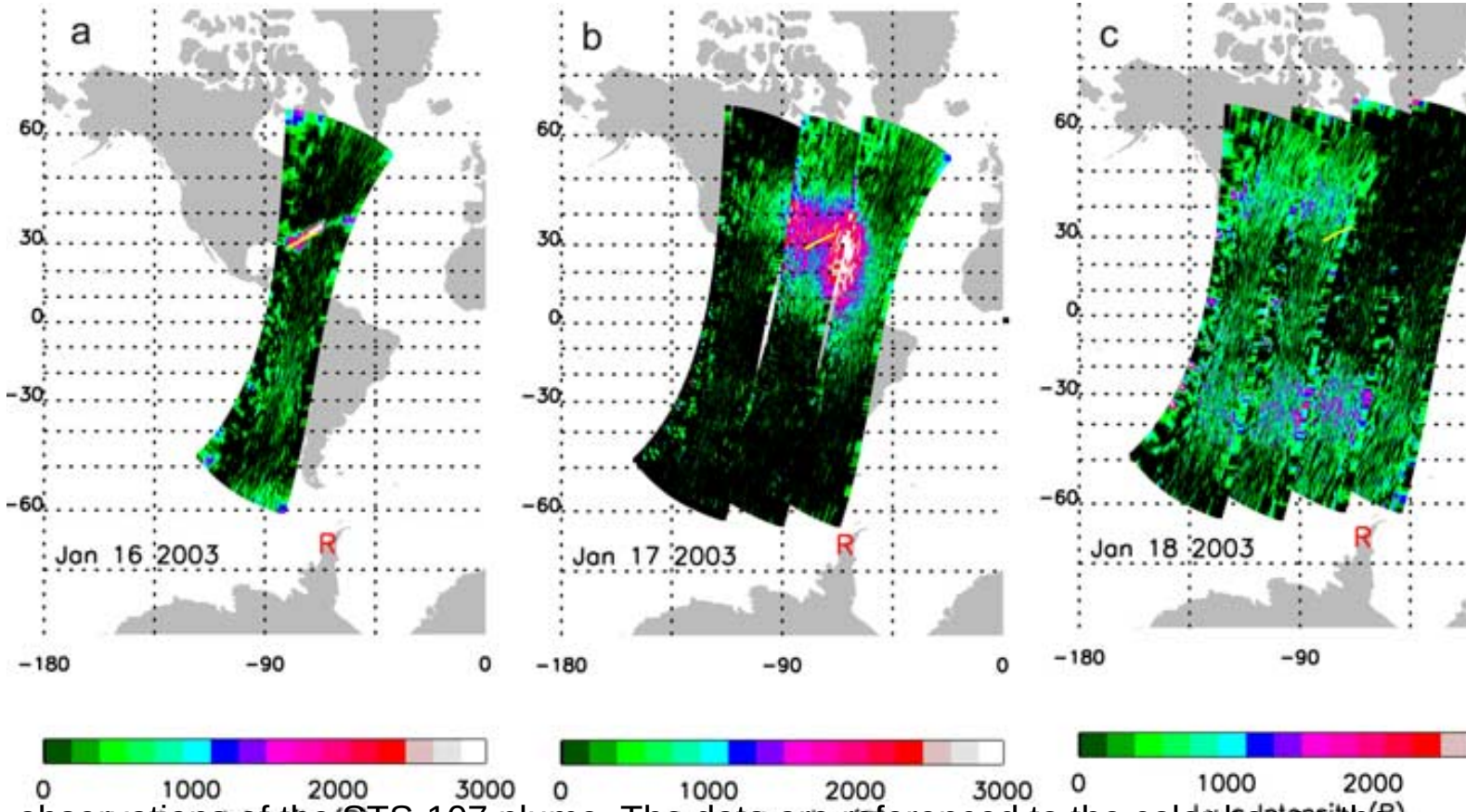
Concentration Profile of Mesospheric Iron with Altitude at PFRR, Chatanika, Alaska.

(Upper) Average profile for night of 9-10 August 2007.

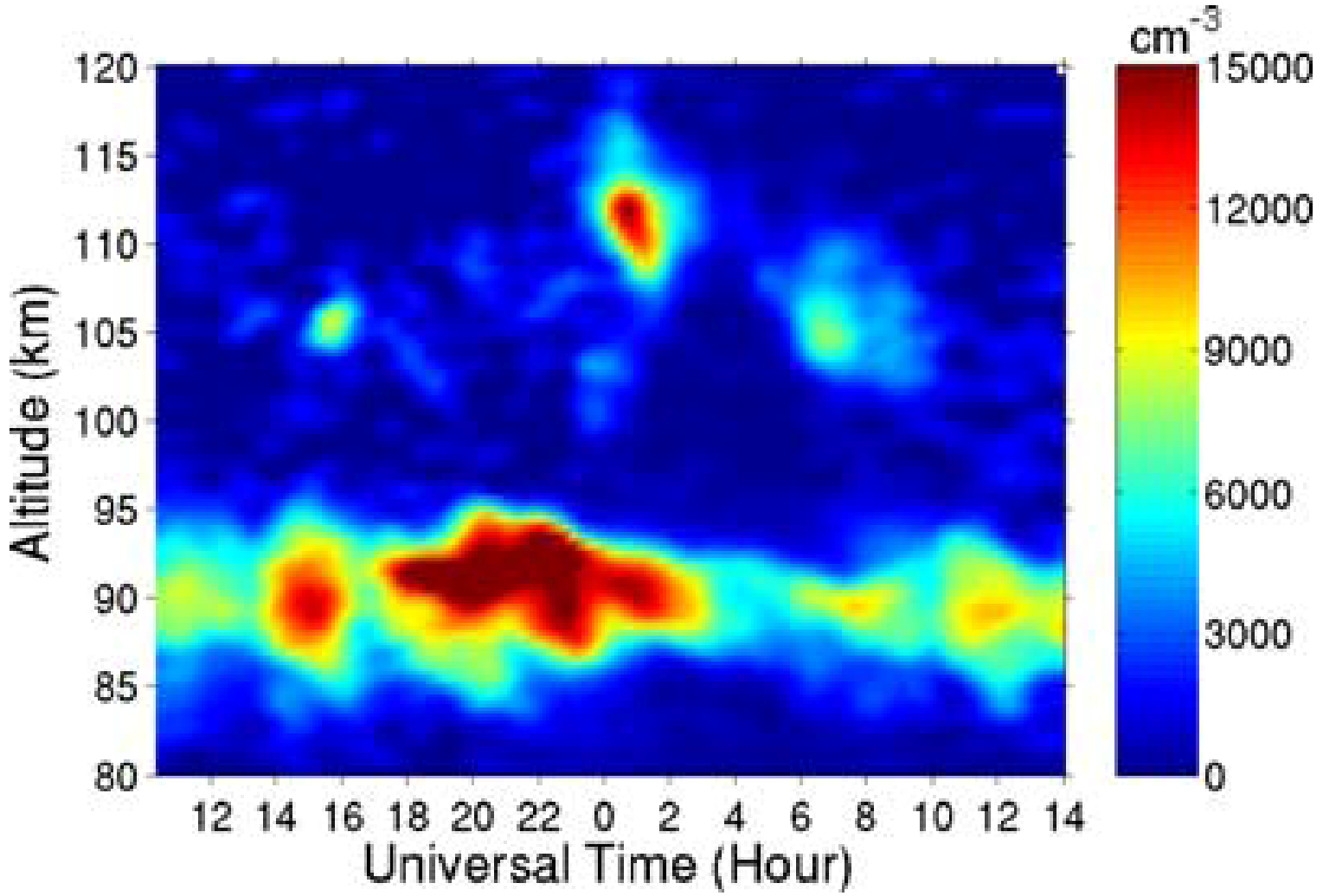
(Lower) Average profile for night of 10-11 August 2007.



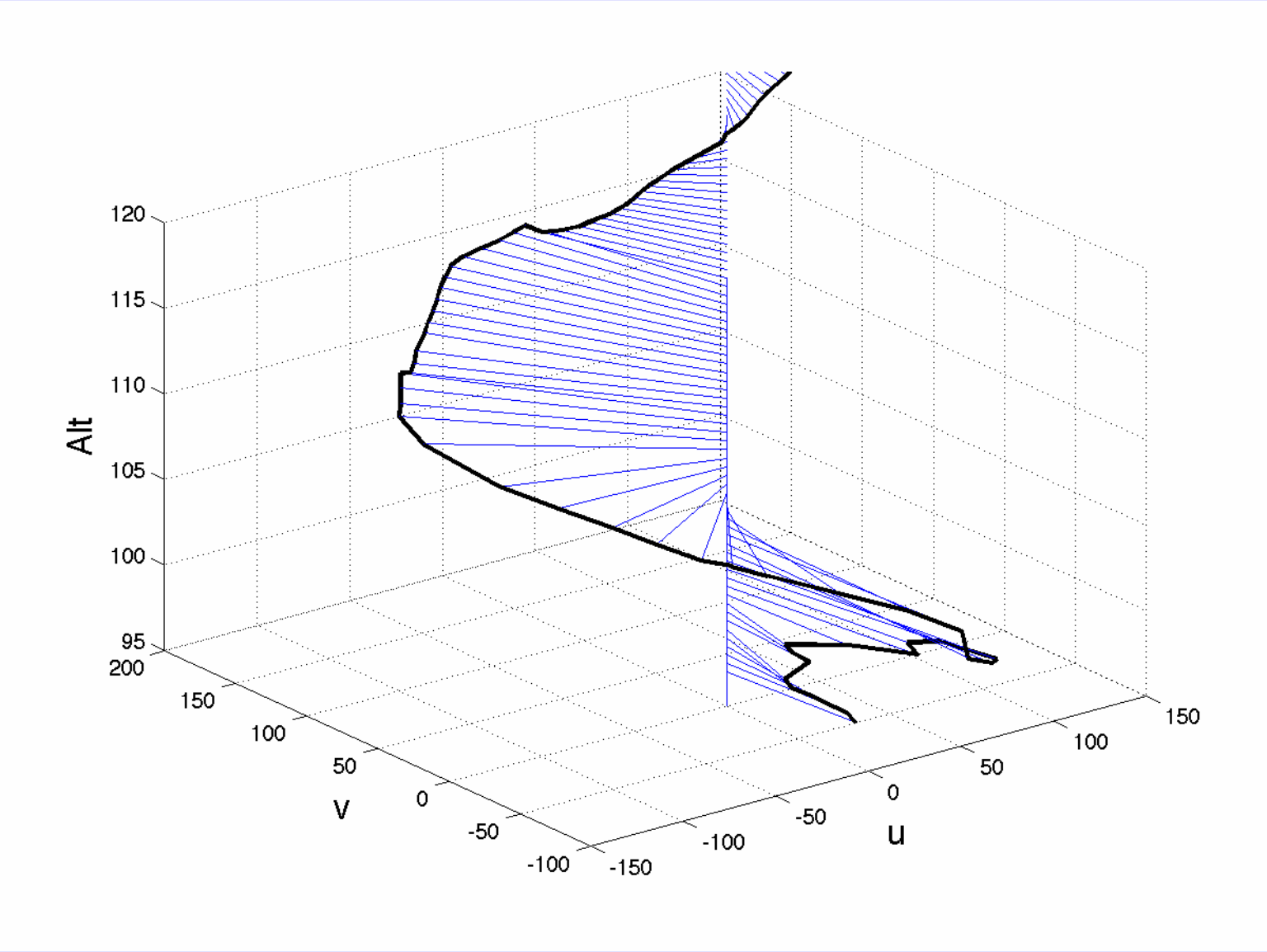




GUVI Lyman α observations of the STS-107 plume. The data are referenced to the color bar on the bottom where the statistical uncertainty is about $\pm$500 R. Each pixel is 7 km square and the images have been smoothed by three pixels in each direction. The location of an Fe lidar in Rothera is indicated by an ‘‘R’’. (a) Shuttle plume 1.8 hours after launch. The white streak of emission off the U.S. east coast is adjacent to the shuttle ground track (in yellow). The main engines were cutoff near 112 km at the northeast end of the ground track. (b) 1.0–1.2 days after launch. A large portion of the effluents moves southward. (c) 1.9–2.2 days after launch. The plume is in the southern hemisphere near 35°S.



Fe densities over Rothera, Antarctica: 19–20 January, 2003. The observations, made 2.8–4.0 days after launch of STS-107, have a vertical resolution of ~1 km and a temporal resolution of ~1 hour. The maximum near 112 km is 1.5×10^4 cm^{-3} ($\pm$200–300 cm^{-3}). There is no known natural source of neutral Fe above 100 km.



Wind profile measured at Wallops Island, VA on 17 July 1997 at 2343 LT. The zonal (eastward positive) component is u. The meridional component (northward positive) is v.

Trees knocked over by the Tunguska blast. Photograph from Kulik's 1927 expedition.

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A possible impact crater for the 1908 Tunguska Event

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Comment article

Evidence that Lake Cheko is not an impact crater

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Properties of Two-Dimensional Turbulence (Kraichnan, 1967)

1. Energy cascades to largest scale in system, enstrophy to smallest scales.
2. Observed in oceans.
3. Largest eddies carry shuttle plume to polar regions.
4. Possible input scale of 500 km based on horizontal shear (only *one* such measurement!).
5. Anomalous diffusion needed to explain observations (Batcheler, 1954).

$$r^2 \propto t^3 \qquad \text{not} \qquad r^2 \propto t$$