

Jupiter in 2010/11: Report no.21

Jupiter's SEB Revival in 2010/11: Analysis of the early stages

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with data from Hans-Jörg Mettig, Gianluigi Adamoli, Michel Jacquesson & Marco Vedovato (JUPOS project).

Figure legends:

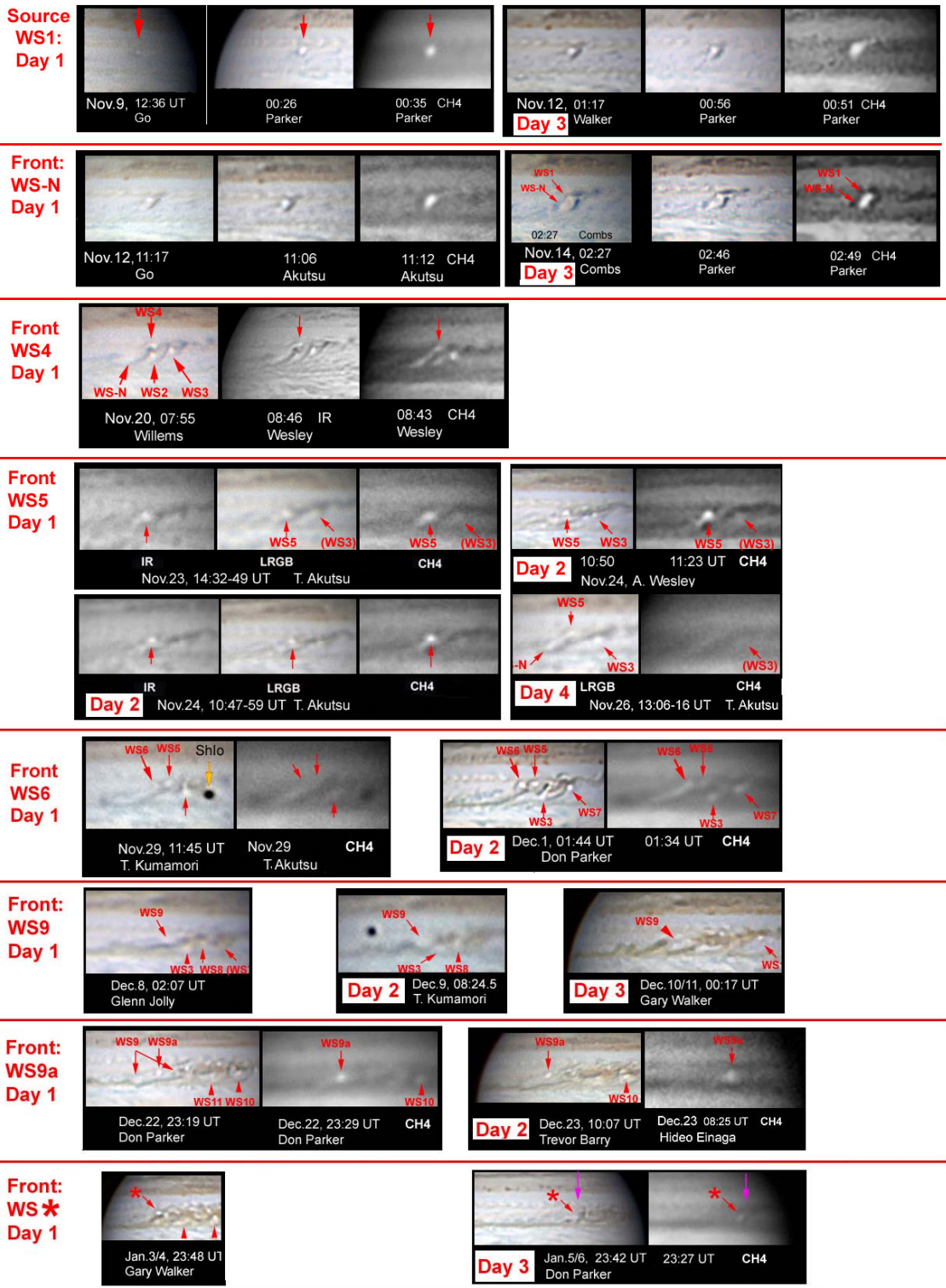


Fig.1. Images of each bright plume on its first and (when possible) third day, in visible (RGB) and methane-band where available. (A) WS1, and plumes in the leading edge complex.

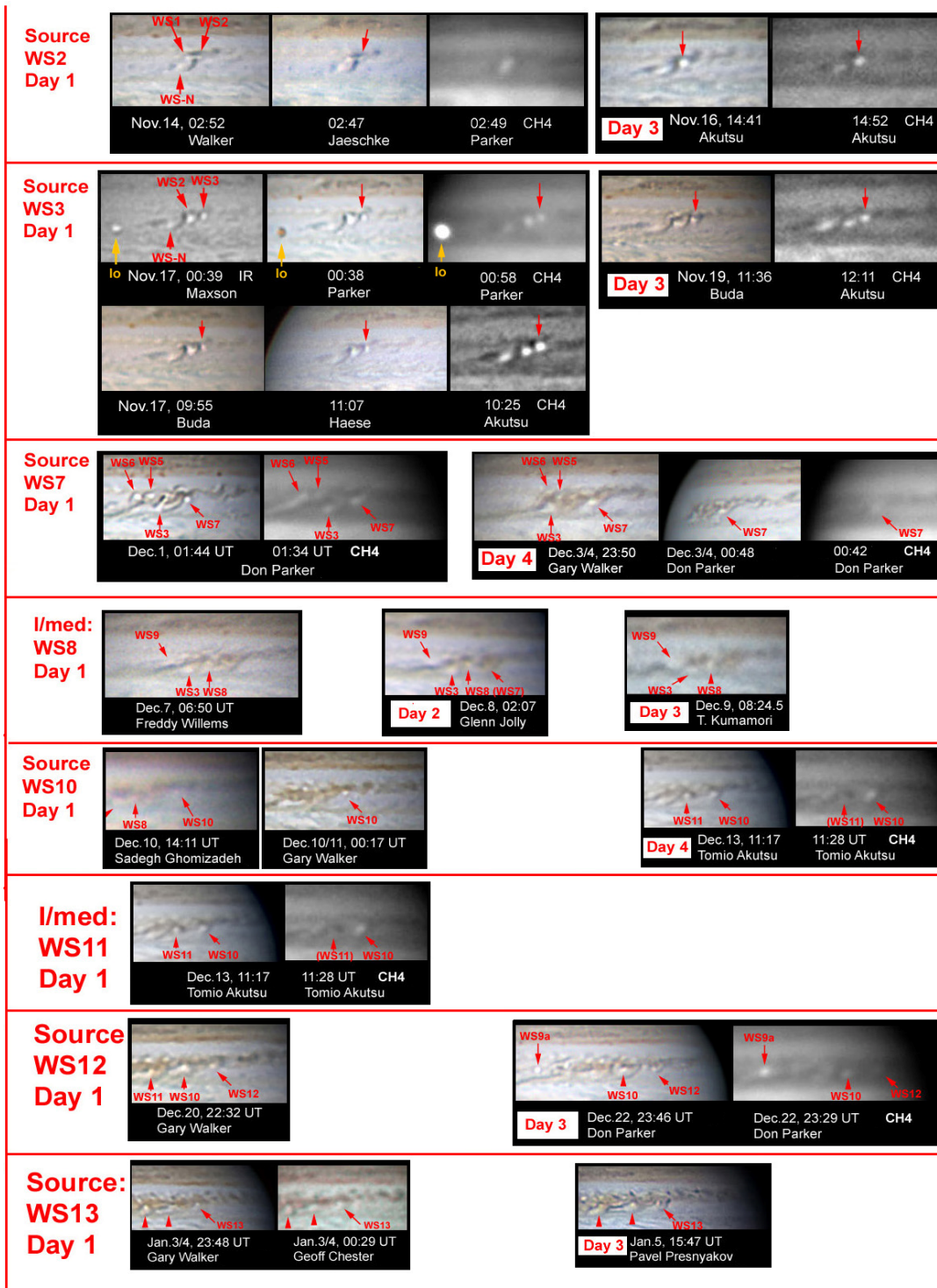


Fig.1. (B) Plumes at the source.

This gallery of images, selected from previously posted compilations, allows qualitative comparison of the plumes at different stages of the Revival. Note that the images differ greatly in resolution and processing so the plume brightness cannot be compared quantitatively; the brightness in methane images is especially dependent on processing. Also, apparent differences between plumes on the first day may reflect the very rapid growth that some showed even within 10-20 hours: WS1 and WS3 brightened especially quickly (see Table 1). Of the later plumes, WS9a (at the front) and WS10 (at the source) were outstandingly methane-bright like the earlier ones, but others at the source (WS7 and WS12) were not.

SEB Revival: bright white spots

JUPOS data plotted by Michel Jacquesson

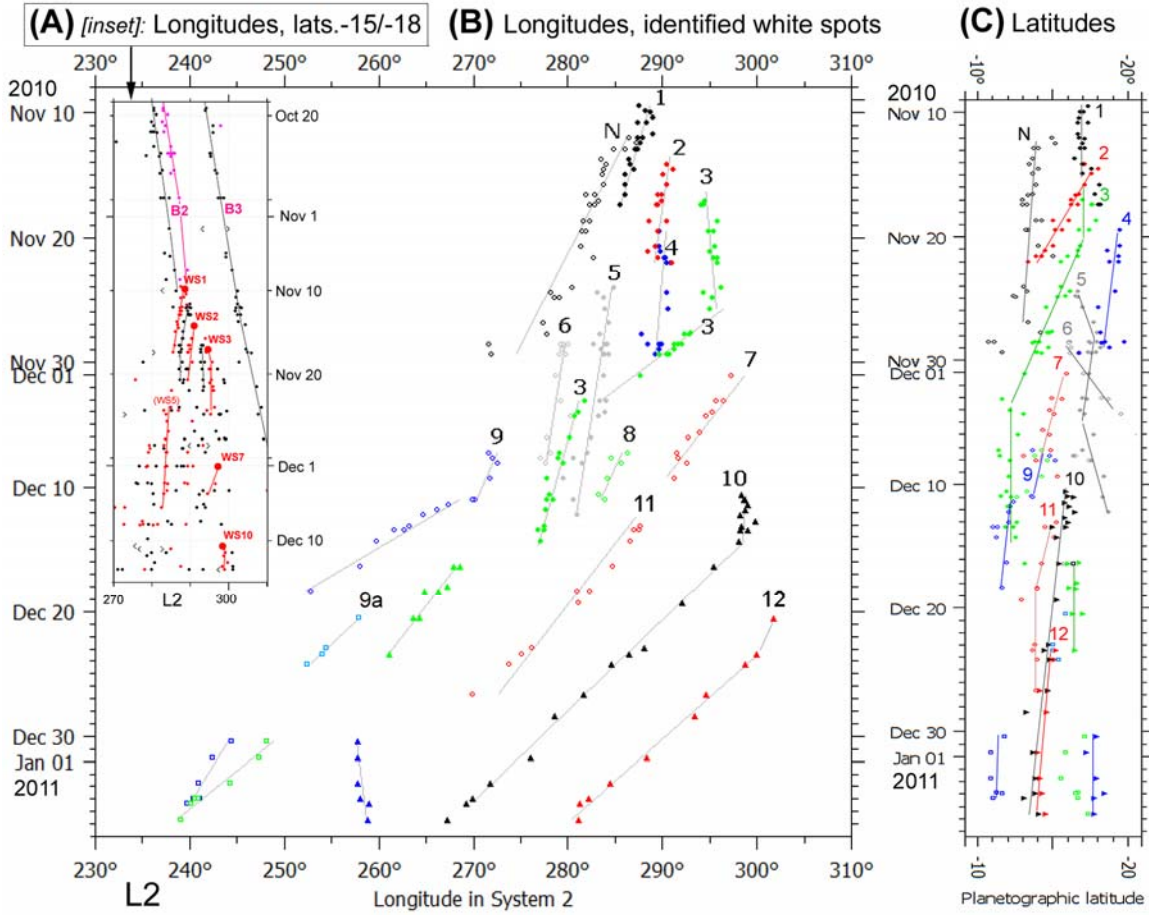


Fig.2.

(A) JUPOS chart of longitude vs time for bright and dark spots in the southern half of the SEB, latitude range 15 to 18 deg.S. Pink, bright spot in barge b2; red, other bright spots, mainly plumes in the SEB Revival; black, dark spots. Large red dots are the first appearances of the plumes at the source, which all fall on the track of barge b2.

(B) Chart of longitude vs time for the bright spots (plumes) in the SEB Revival, produced from JUPOS data by Michel Jacquesson, colour-coded by spot number.

(C) Chart of latitude vs time for the same spots, produced by Michel Jacquesson.

Bright plumes in SEB Revival: latitude vs speed

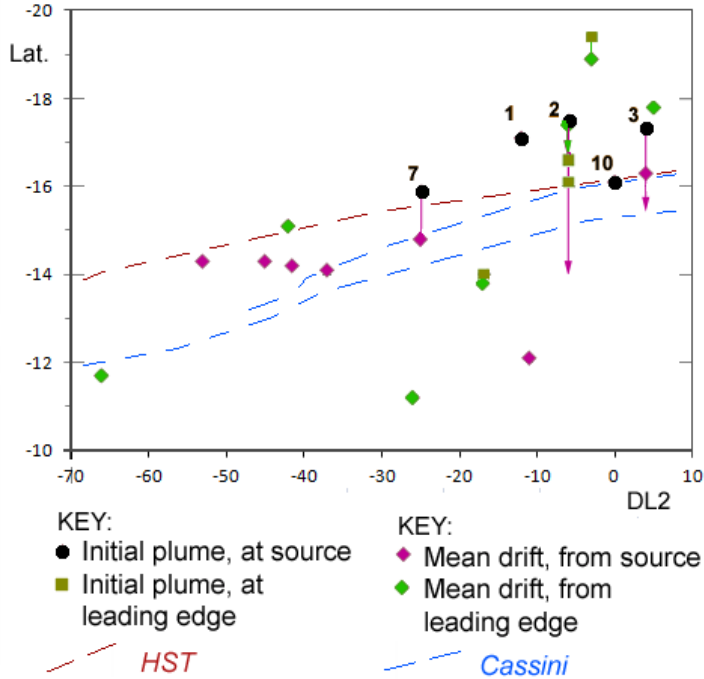


Fig.3. Chart of latitude vs speed for the bright spots (plumes) in the SEB Revival, from data in Fig.B and Table 2. Dashed lines are the mean zonal wind profiles from HST, 1994-1998 (Garcia-Melendo & Sanchez-Lavega, 2001) and from Cassini, 2000 (Porco et al, 2003). (Even in those ‘normal’ years, they showed considerable scatter across this region, including multiple gradients as shown for Cassini, which may represent different longitude sectors).

The SEB Revival: development of the main components

[Compilation by John Rogers, BAA]

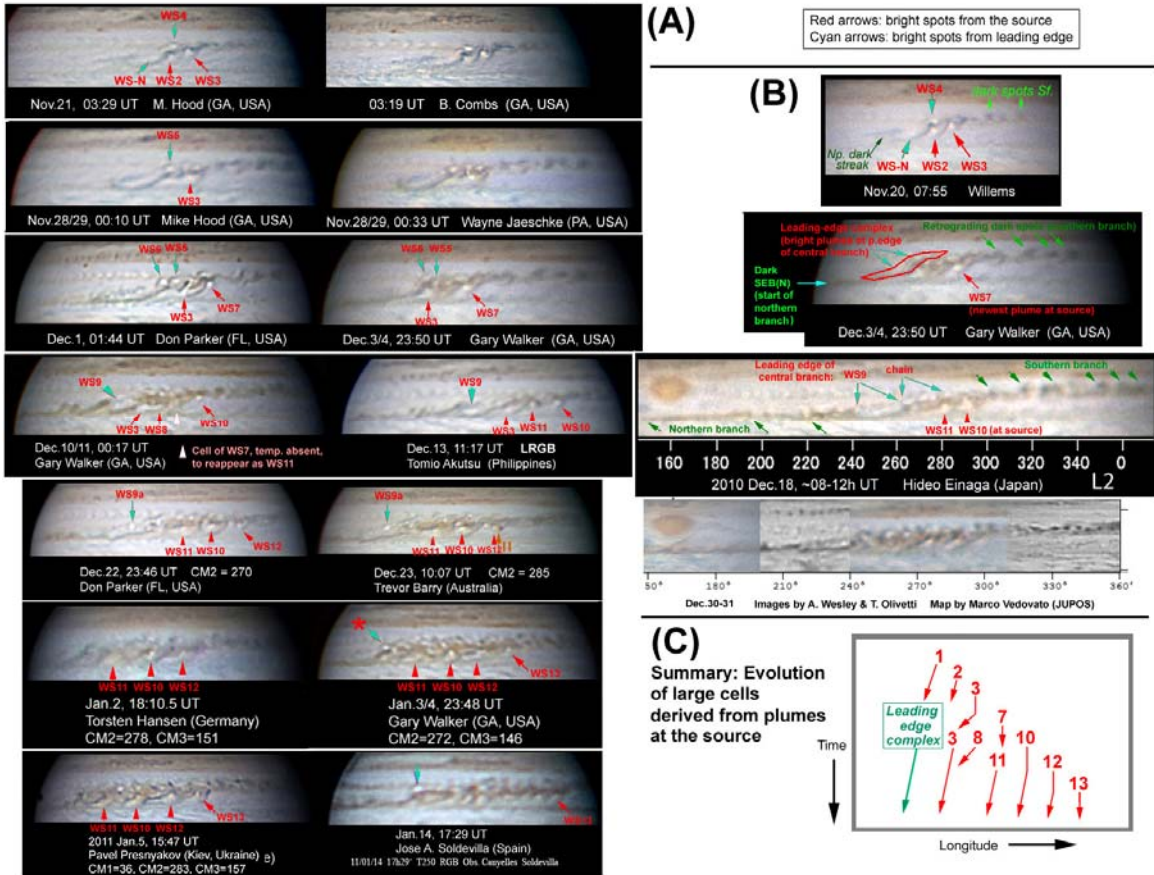


Fig.4. The overall structure of the Revival. (Images selected from previously posted compilations.)
 (A) The developing cellular structure of the central branch. Red arrows below indicate plumes at the source. Blue/cyan arrows above indicate plumes in the leading edge complex.
 (B) Images and maps with the main components of the Revival labelled.
 (C) Diagram showing the evolution of the large cells derived from the bright plumes from the source.

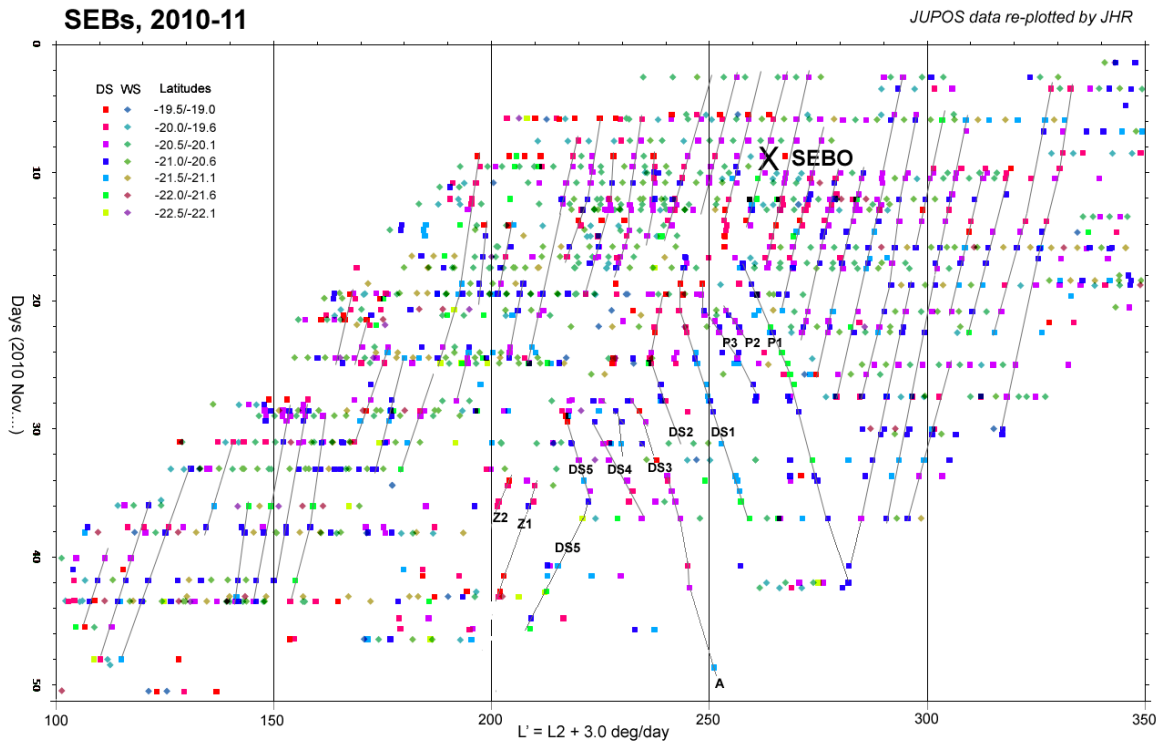


Fig.5. Chart of longitude vs time for dark spots in the southern branch: JUPOS data, re-plotted using Excel, in a longitude system moving at +3.0 deg/day relative to System II. Spots are colour-coded by latitude, allowing spots in slightly different latitudes to be distinguished. The ubiquitous chain of small bright spots and projections was drifting with $DL_2 \sim +72 \text{ deg/month}$. P1 was a small pre-existing projection which suddenly darkened and accelerated; P2 and P3 were similar. DS1 to DS5 were larger and darker spots. (However this chart shows only the JUPOS measurements made up to late Dec. For other versions of the chart, including a larger range and additional measurements of identified spots, see the detailed analysis in Report no.22.)