

Interactive comment on “27-day variation in cloud amount and relationship to the solar cycle” by Y. Takahashi et al.

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Dear Dr. Weber,

Authors would greatly appreciate your positive evaluation and constructive comments, which may improve the revised manuscript.

1.) The detailed frequency analysis separating solar maximum and minimum phases was only done for OLR data in the WPWP, but Fig. 1 shows also strong signals in the Indian ocean region. Do the results for WPWP also hold for the Indian ocean region? The Madden-Julian-Oscillation is connected to the Asian monsoon, so I guess, the investigation of the Indian Ocean region could put some additional light into relations between the 24-30 day signal and MJO frequencies. I would like to see a repeat of

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Figs. 3 and 4 for the Indian Ocean region.

Answer: We completely agree with your opinion. The analysis for Indian Ocean would be essential since MJO starts there and also have a strong power in the frequency range of around 27-day. We examined this region like as WPWP and found that there sometimes exists 27-day peak but the relationship with regards to 11-year solar activity is not so clear and constant compared to WPWP. Also the strong enhancement seen in Figure 1 is caused not only by the local peak around 27-day, but sometimes also caused by the enhancement over the broad range of period. In other words, Indian Ocean makes large amplitude modulations at every periods, resulting in enhancement of Figure 1 also at about 27-day. Still there is no doubt that the Indian Ocean is one of the most important regions to investigate 27-day periodicity of OLR. We plan to conduct more detail analysis for this region as next step.

2.) As another reviewer already stated, the 24-30 day signal could be related to MJO frequencies (50-80 days). If you have two strong signals, one can expect signals in the beat frequencies (sum of and difference between dominant frequencies). So 80 minus 50 yields 30 and could therefore explain peaks in the 24-30 day range. The MJO frequencies are apparently stronger during solar maximum years (see Fig. 3).

Answer: As seen in Figure 3c, peak in the 24-30 day range could be larger than the power in the longer period range. Also, as seen in Figure 3a and 3e, no double-peaked structure is found in the MJO range, which can make a beat periodicity. The widths of MJO enhancements in Figure 3a and 3e are much broader than 27-day peak, which may not cause the sharp peak around 27-day.

3.) The abstract should be rewritten to bring out more concisely the results of this paper. The first two sentences in the abstract are a repeat of the start of the Introduction section. The abstract should contain what has been done (frequency analysis of OLR and F10.8 cm), what are the major results (solar activity phases, MJO), and possible explanations for the solar link and/or a statement that exact causes/mechanism for this

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connection is not known.

Answer: We will improve the abstract so as to express the essential points adequately according to your suggestions.

Thank you very much again for your considerate comments.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 15327, 2009.