

**“Understanding the coupling of surface, boundary layer, cloud and radiative processes in the Global Water and Energy Cycle”**

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1) Project Status & Progress.

Two papers reached final form. Fernandez et al [2008] is in press in JGR; and Betts et al. [2008] is also in press, awaiting the completion of other chapters for the LBA synthesis volume.

New work has focused on two main projects during these past six months.

- a) Evaluations of MERRA in comparison with data and ERA-40 on river basin scales. This was presented at the AMS Conference [Betts and Bosilovich, 2008]. In addition, evaluation of MERRA against multi-model analyses and CEOP flux tower sites [Bosilovich et al. 2008].
- b) A comparison of the ERA-Interim reanalysis with ERA-40. A paper is in preparation [Betts and Köhler, 2008]

**References**

Betts, A.K., M.A.F. Silva Dias, G. Fisch, C. von Randow, J.C.P. Cohen, R.da Silva, D.R. Fitzjarrald, 2008. The Amazonian Boundary layer and mesoscale circulations. Chapter B3 in IGBP Synthesis Vol. *Amazonia and Global Change*. Eds. M. Keller, J. Gash, P. Silva Dias. (in press).

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Fernandes, K., R. Fu and A. K. Betts (2008) How well does the ERA-40 surface water budget compare to observations in the Amazon River basin? *J. Geophys. Res.*, 113, Dxxxx, doi:10.1029/2007JD009220. <ftp://members.aol.com/akbetts/FernandesFuBetts2007JD009220.pdf>

Betts, A. K. and M. Köhler, Comparison of ERA-interim river basin hydrology with ERA-40. In preparation.

*Conference Proceedings and papers: 2008*

Betts, A. K. and M. Bosilovich (2008), Comparison of MERRA with ERA-40 on river basin scales. 20th Conference on Climate Variability and Change (Joint with Hydrology), Amer. Meteor. Soc. New Orleans, January 20-24, 2008.

Balsamo, G., A. Beljaars, P. Viterbo, B. van den Hurk, M. Hirschi and A. Betts (2008), Terrestrial water storage in NWP: Are we gaining a better understanding? CAHMDA-3 workshop, Melbourne, Australia, 9-11 January, 2008.

Frederic J. F. Chagnon, MIT, Cambridge, MA; and R. L. Bras, J. Wang, E. Williams, A. K. Betts, N. O. Renno, L. A. T. Machado, R. Knox, and G. Bisht, Do Clouds Follow Deforestation Over the Amazon? Amer. Meteor. Soc. New Orleans, January 20-24, 2008.

Bosilovich, Michael G., NASA/GSFC/GMAO, Greenbelt, MD; D. Mocko, J. O. Roads, and A. K. Betts. Evaluation of a reanalysis system with CEOP station observations and multi-model analysis. Amer. Meteor. Soc. New Orleans, January 20-24, 2008. Third WCRP International Conference on Reanalysis January 28 – February 1, 2008, Tokyo, Japan.

2) Collaboration: What connections were made, and how did NEWS benefit from your collaborations?

The NEWS project envisaged using the GEOS-5/MERRA system to provide integrated data products that could not be assessed directly from data. Our work is intended to improve the quality of the GMAO modeling system, and it has certainly made a contribution to this. However, because the MERRA output has been delayed [from the original timetable], we have made less progress than we expected when we started this project in 2005.

3) Issues: None that I can see.

4) N/A

5) Integration: It is not clear as yet how this project can contribute effectively to the three ‘new’ data integration projects in the next 6 months. The time-frame of project-1, which we are most closely connected with, goes well beyond the end of this NEWS grant in September.

6) Alignment with NEWS IP:

In the Implementation Plan, my project D029 is associated with this objective:

“Develop and test next generation energy *and water data assimilation systems* that can ingest relevant atmospheric and hydrologic measurements and determine initial values for regional to global model predictions of variations or change in the global precipitation and hydrologic regimes. [P179, P448, D435, P143, D029, D471, D118]”

This I have been working on with Mike Bosilovich at the GMAO (see 2).

### **Conclusion.**

My ‘discovery’ project was framed more towards understanding the interaction of processes and model evaluation, and this has been a productive year. My sense is that the thrust of the NEWS program has moved this year towards larger scale synthesis products. As a result, there is now a bit of a mismatch, which I do not think I can close in this the final 6-months of this NEWS grant.