Hydrol. Earth Syst. Sci. Discuss., 7, C4228–C4230, 2010
www.hydrol-earth-syst-sci-discuss.net/7/C4228/2010/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Real-time remote sensing driven river basin modelling using radar altimetry" *by* S. J. Pereira-Cardenal et al.

G. J.-P. Schumann (Referee)

guy.schumann@bristol.ac.uk

Received and published: 16 December 2010

The authors present an interesting integrated basin-wide water allocation modelling application largely driven by satellite data, particularly for countries with no or very little in-situ data and/or no forecasting abilities. Satellite altimeter data are assimilated into a conceptual lumped RR model to predict reservoir water levels which then feed into a water allocation model.

The paper is generally well structured and very well written. It reads nicely and it is a timely study for the remote sensing community as well as for monitoring/modelling water resources allocation in largely ungauged regions of the world, although there are a few things that need to be addressed before this paper can be published:

Abstract: -Is the stated final RMS error of 6.7 m reasonable, when in some reservoirs the total water level variations over one year are 10 to 20 m max or so?

-I have a slight issue with the sentence in line 26-27 in that given the revisit times of the altimeter data used (35 days) and the fact that the study is based on archived data, the study is not really pointing towards a near-real time operational forecast and as such it is difficult to make any conclusions about whether this could actually be provided operationally in real time forecasting mode. . .

-The authors should state briefly, maybe in brackets, where Syr Darya basin is.

p. 8350: here the authors could also mention other data assimilation studies using remotely sensed data in the form of image derived water levels and hydrological modelling, such as e.g.: Neal, J. C., G. Schumann, W. Buytaert, P. D. Bates, P. Matgen, F. Pappenberger, 2009. An assimilation approach to discharge estimation from space. Hydrological Processes, 23, 3641-3649., or even: Montanari, M., R. Hostache, P. Matgen, G. Schumann, L. Pfister and L. Hoffmann, 2009. Calibration and sequential updating of a coupled hydrologic-hydraulic model using remote sensing-derived water stages. Hydrology and Earth System Sciences, 13, 367-380.

p.8356: More detailed explanation on the selection of areas of low or more significant runoff is needed here I think, i.e. was this done in a quantitative way or rather based on arbitrary threshold values?

p.8360: I am wondering whether the way the authors selected this 2.4 scaling factor is justified (line 24: '3B42-RT was 2.4 times higher than the precipitation from 3B42')? Both products (research and RT) are satellite derived and could thus both be wrong???

p.8362: At the start of section 4 the authors only list very briefly possible reasons for the large variation in model performance. This should be more elaborated.

p. 8363-8364: here it would be helpful to go into more detail and a possible explanation on why there is generally such a very poor performance of the RR model for the

reservoirs Chardara and Kayrakkum. At Chardara the model seems to be missing any clear seasonal dynamics and at Kayrakkum there seems to be some sort of a phase shift.

p. 8364: why is the altimeter error so large (only 15 cm or so short of 1 m) for this test site? Are there any particular reasons for this?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 8347, 2010.