ESA - MOST Dragon 2 Programme

2011 DRAGON 2 SYMPOSIUM

中国科技部-欧洲空间局合作 "龙计划"二期

"龙计划"二期2011年学术研讨会

Project Summary

id.5341 Drought Monitoring

Friday, 24 June 2011

Main Results

1. Establishment of the Tibetan plateau soil moisture and soil temperature observatory
2. Retrievals of surface soil moisture from high and low resolution satellite data (ASAR data for soil moisture; course resolution soil moisture from ASCAT/AMSR-E/SMOS)
3. Optical/TIR data for energy balance analysis and evaporation
4. Water budgets for river basins using GRACE and LSMs
5. Identifications of model deficiencies and data assimilation
6. Analysis of the structure of the atmospheric boundary layer and UTLS exchanges on the Tibetan plateau
7. Assessment of different approaches for drought monitoring, prediction and assessment

Issues and Recommendations

(Proposed action points for Dragon III)

1. Satellite observations in data scarce environment are critical for quantifying climatic impacts – application agencies should develop dedicated capacities (ASAR data for soil moisture; optical/TIR data for energy balance analysis; course resolution soil moisture from ASCAT/AMSR-E/SMOS, Water budgets)
2. Uncertainties in satellite observations needed to be quantified with in-situ reference observations data – drought monitoring befits from advanced data retrievals
3. Modeling results need to be verified before used in drawing conclusions about climatic change impacts – data assimilation necessary
4. Concerted actions needed to aggregate and analyze climatic impacts in data scare environment – data sharing (e.g. in international collaboration) essential
5. Existing studies need to be analyzed in detail – separating those based observation data with uncertainty certification from less rigorous studies
6. Studies should be extended to adaptations!

List of Publications

van der Velde, R., Su, Z. (Promotor) and van Oevelen, P.J. (assistant promotor), 2010, Soil moisture remote sensing using active microwaves and land surface modeling. PhD thesis University of Twente; summaries in Dutch and English. ITC Dissertation 176, ISBN: 978-90-6164-296-1.

Chen, X.L., Ma, Y.M., Kelder, H., Su, Z., and Yang, K., 2011, On the behaviour of the tropopause folding events over the Tibetan Plateau' by X. L. Chen, et al, Atmospheric Chemistry and Physics (ACP), 11, 5113–5122, (www.atmos-chem-phys.net/11/5113/2011/)

Ma, W., Ma, Y., Hu, Z., Su, Z., Wang, J., and Ishikawa, H., 2011, Estimating surface fluxes over middle and upper streams of the Heihe River Basin with ASTER imagery, Hydrol. Earth Syst. Sci., 15, 1403-1413, doi:10.5194/hess-15-1403-2011.

Ma, W., Ma, Y., and Su, Z., 2011, Feasibility of Retrieving Land Surface Heat Fluxes from ASTER Data Using SEBS: a Case Study from the NamCo Area of the Tibetan Plateau, Arctic, Antarctic, and Alpine Research, 43(2): 239-245/DOI:10.1657/1938-4246-43.2.239

Romaguera, M., Hoekstra, A.Y., Su, Z., Krol, M.S. and Salama, M.S., 2010, Potential of using remote sensing techniques for global assessment of water footprint of crops. Remote Sensing: an international journal of the science and technology of remote sensing and the applications, 2(4), 117-1196.

Salama, M.S. and Su, Z., 2010, Bayesian model for matching the radiometric measurements of aerospace and field ocean color sensors. Sensors,10(8),7561-7575.

Su, Z., Wen, J., Wagner, W., 2010, Advances in land surface hydrological processes: field observations, modeling and data assimilation: preface. Hydrology and Earth System Sciences, 14, 365-367.

Zhong, L, Ma, Y., Su, Z., Salama, M.S., 2010, Estimation of Land Surface Temperature over the Tibetan Plateau using AVHRR and MODIS Data. Advances in Atmospheric Sciences, doi: 10.1007/s00376-009-9133-0.

Zhong, L., Ma, Y., Salama, M.S., Su, Z., 2010, Assessment of vegetation dynamics and their response to variations in precipitation and temperature in the Tibetan Plateau. Climatic change, DOI 10.1007/s10584-009-9787-8.

Project Planning – 2011 and 2012

1. Continuous in-situ observations
2. Continuous cal/val of EO data products
3. Validation & improvements of model parameterization
4. Assimilation of EO data into modeling system
5. Setting-up of drought monitoring & prediction system
6. Publications