Review by J. Wen:

General comments:
To improve the understanding of water cycle on the Earth, the detail analyses of several hydrological relevant geophysical variables are essential. In this research, the authors presented a very good and comprehensive overview about methodologies, retrieval results and validation of evapotranspiration, soil moisture, cloud products and water vapour. They also provided much useful information about satellite remote sensing technology to the general readers. This manuscript showed that the authors have very strong background in this research field, and also familiar with the current front research topics in this field, and referred many former investigations. I suggest accepting it for publishing in this journal after making a minor technical correction to the flaws appeared in the manuscript.

We thank J. Wen for his encouraging comments. The suggested changes and other additions are made in the revision.

Specific points:
Pg3L5: Explain what kind of "Earth observation technology" is mentioned here.

Reply:
'technology' is deleted as it is too vague in the abstract and there is little space for its explanation. More details are given in the introduction section.

"In recent years, EO technology has proved to be a major source of data to retrieve an increasing number of hydro-climatic variables from space, including radiation and cloud properties (Schulz et al., 2009), precipitation (Kummerow et al., 2001; Huffman et al., 2007; Kidd and Levizzani, 2010), evapotranspiration (Kalma et al., 2008; Jiménez et al., 2011), soil moisture (Aires and Prigent, 2006; De Jeu et al., 2008), water vapour (Schulz et al., 2009), and many others (see for example, GEO, 2005; ESA, 2006; CEOS, 2009; Su, 2010). Such measurements not only have enhanced our capabilities to predict in a reliable manner the variations in the global energy and water cycle but also have provided a key contribution to the improvement of water governance, the mitigation of water-related natural hazards and the sustainable human development (GEO, 2007; IPCC, 2008). "

Pg3L7: A comma is needed after "coming years".

Added.

Pg3L23-25: The incident radiation does not evaporate water from water bodies and soil! Please rewrite this sentence.

Reply: This is changed into the following:
"The evaporation of water from open water and soil and wet surfaces is controlled by energy and water availability and near-surface atmospheric conditions (air temperature, humidity and wind-speed), while transpiration of water is also controlled by plants."

Pg4L9-13: "and because different physical processes control the change in water vapour and evaporation/precipitation, a more extreme distribution of precipitation is expected leading to, in general, wet areas wetter and dry areas dryer and as such the changes in the hydrological

cycle as a consequence of climate warming may be more severe that the temperature changes". This is not the real case, please clarify this!

Reply: This is a possibility as described by Bengtsson (2010), indicating that the impacts of the climate change will be mainly exemplified in the changes in the hydrological cycle resulting in floods and droughts and could be more severe than the temperature changes.

Pg4L24: What is "surface water level"?

Reply: Surface water level refers to the heights or levels of a surface water body, e.g. lakes or rivers, with respect to a reference height (e.g. mean sea level).

Pg5L8: "has" should be "have" here!

Corrected.

Pg5L5: Products could be described by the word "robust"!

Reply: This refers to P5L15, the paragraph is changed to
"Develop validated products for which the range of validity and uncertainties are known and characterised. This will involve the development of robust physically based algorithms supported by a strong validation and inter-comparison exercise;"

Pg5L7: A full stop is need at the end of this sentence!

Ok.

Pg6L3: A comma is needed after "years"!

Added.

Pg43: The images in Figre2 need to be reprocessed!

These are updated with high resolution images in production.

Pg14L1: A word "indirectly" is needed before "estimated"!

Added.

Pg46: The incorrect value (extreme big evaporative fraction) in the right of figure 5 need to be removed before making the plot!

This is changed.