

## **Observations from AMSR-E Depart the Earth. A Remarkable Satellite Sensor Stopped after Nine Years of Duty**

Last week the news about the Advanced Microwave Scanning Radiometer for the Earth Observing System (AMSR-E) failure on board the Aqua satellite was announced. The instrument suddenly had stopped due to a problem with the rotation of the antenna. NASA and JAXA scientists are still investigating the condition of the instrument, but at this point it appears that it is most likely the end for AMSR-E.

Since June 2002 this sensor has given the scientific community a wealth of information of our home planet, in particular for global change research and monitoring efforts. AMSR-E was specifically designed to observe water-related geophysical parameters such as precipitation, oceanic water vapour, sea ice extent and surface soil moisture. The sensor managed to exceed the designed 6-year mission lifetime significantly leading to a 9+ year continuous and consistent data record. The great success of AMSR-E revolved to the design of its successor AMSR-E II, which will be on board the Japanese GCOM-W satellite with its currently scheduled launch for 2012. Unfortunately, the sensor did not make it until this launch however scientists and engineers may attempt to temporarily restore AMSR-E in the future providing an overlapping data period.

As a dedicated group of AMSR-E users and satellite soil moisture developers we would like to take the opportunity to honour this sensor and thank everybody who made this sensor such a success. Especially the people of NASA, JAXA and NSIDC who made it possible for us scientists to use the data of this remarkable satellite sensor. As a token of appreciation we would like to demonstrate its excellent soil moisture monitoring skills by showing some imagery and animations over the last period just before it went silent on October 4, 2011.

AMSR-E thank you for the valuable dataset of the Earth and Bon Voyage!



**Soil Moisture Team**

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## Droughts

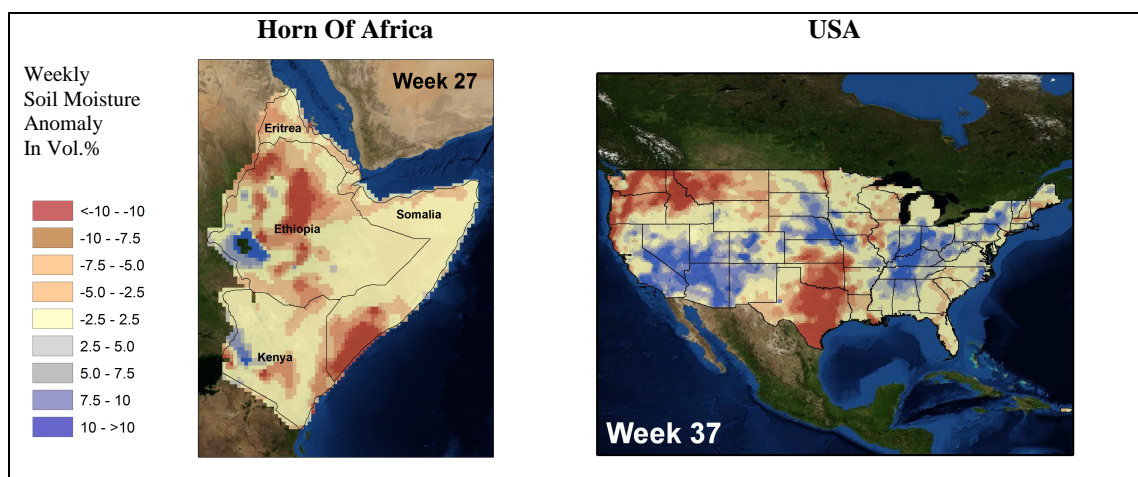
The Horn of Africa and Texas are two regions that currently suffer from a severe drought. Satellite soil moisture observations from AMSR-E were used to monitor the droughts over these two regions. Weekly soil moisture anomalies were calculated by subtracting the weekly average 2002-2010 soil moisture map from a weekly average 2011 observation.

The Land Parameter Retrieval Model (LPRM) Level 2B soil moisture products were used to make these maps (data accessible at <http://gcmd.nasa.gov>). A soil moisture anomaly animation for the Horn of Africa was made for a 13 week period between 3 July and 1 October 2011.

This animation clearly demonstrated the persistent drought pattern over Southern Somalia over the past months. On 20 July the United Nations officially declared this region famine.

Another soil moisture animation was made for Continental US for a seven week period between the 31<sup>st</sup> of July and 17 September. In this animation the drought pattern over Texas is also persistent over the entire period and the wet impact of Hurricane Irene is clearly visible in the North Eastern part of the US from week 35 onwards.

AMSR-E was one of the few satellites sensors in orbit that could visualize the extent and behaviour of the droughts with a high degree of detail and has been used in several international drought programs.



The animations can be found on

Horn of Africa: [http://www.falw.vu/~jeur/amsl/HoA\\_anomalies\\_animation.gif](http://www.falw.vu/~jeur/amsl/HoA_anomalies_animation.gif)

USA: [http://www.falw.vu/~jeur/amsl/Texas\\_animation.gif](http://www.falw.vu/~jeur/amsl/Texas_animation.gif)

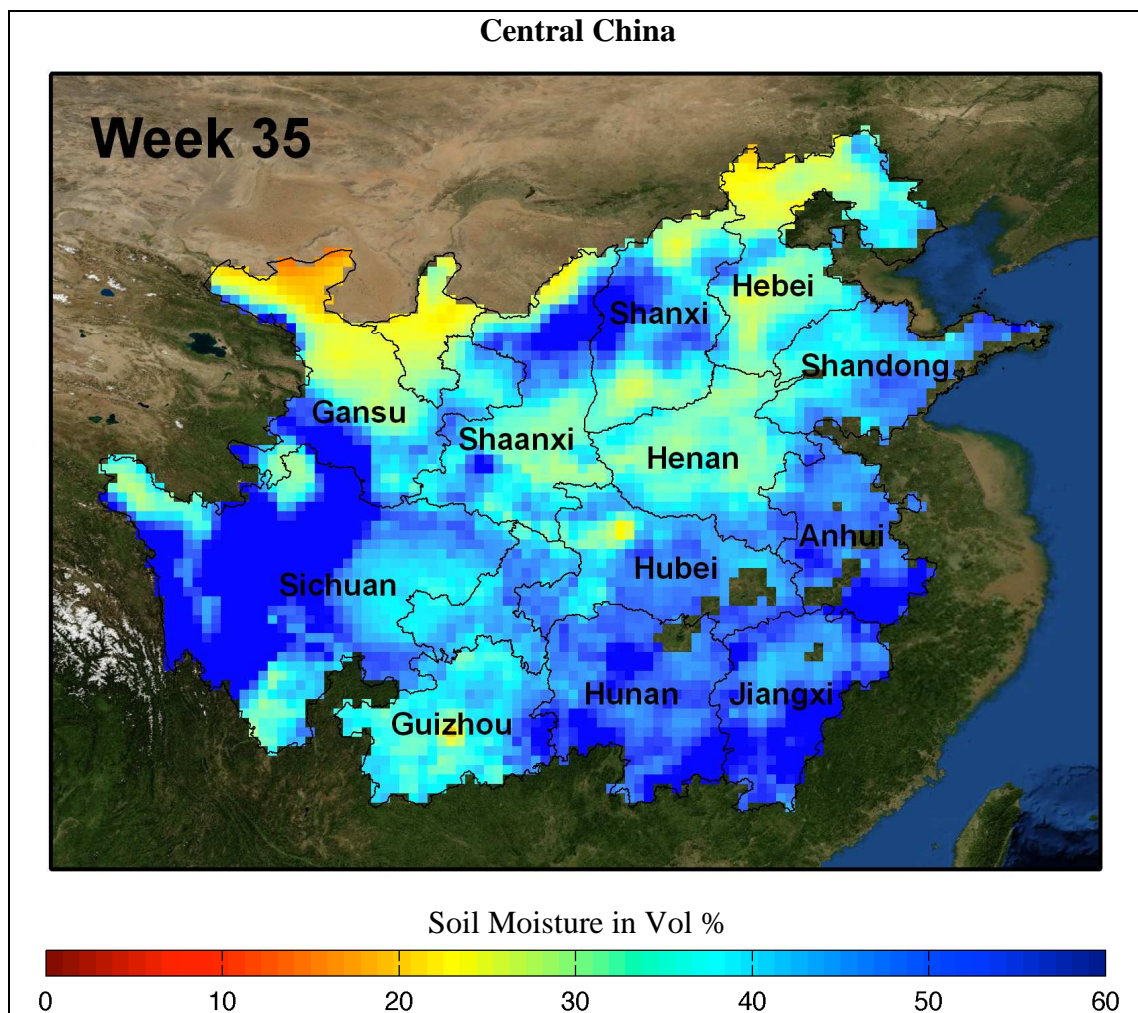
## Floods

Most recently, mid-September 2011, a large part of Central China suffered from severe flooding. A number of provinces including Sichuan, Henan and Shaanxi, were flooded due to an extensive period of heavy rainfall leading to the worst flooding since the year 1847 in this particular area.

The affected region has an estimated population of 12.3 million residents, more than 120,000 houses were destroyed and economic losses are currently estimated to be around 2.7 Billion U.S. Dollar.

A soil moisture animation was made for this region to demonstrate the impact of this extreme event. The LPRM L2B soil moisture products were used in this animation. The direct soil moisture maps of the Central China area show a huge wet area, right after the heavy rainfalls.

Over the years this kind of information from AMSR-E has been integrated in Flood Forecasting Systems in Europe and Australia to warn the community for large floods.



The animation can be found on:

[http://www.falw.vu/~jeur/amsr/China\\_SM\\_animation.gif](http://www.falw.vu/~jeur/amsr/China_SM_animation.gif)

## Global Soil Moisture Mapping

These final images shows AMSR-Es first and final act. On June 18 it all started with the first high quality soil moisture images and it ended on October 3 with the last image. In between AMSR-E collected a huge quantity of data that will be used by many scientific communities in the coming years.

