



## INTERNATIONAL ASTRONAUTICAL FEDERATION

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#### IAC 2013 – PLENARY 5

### Space-borne Observations in Support of Water and Food security

The role of space-based satellite observations in helping society solve one of the most fundamental problems it faces today was addressed at the 64<sup>th</sup> International Astronautical Congress (IAC) today (Wednesday, 25 September 2013) in Beijing, China.

Delegates attending Plenary 5 heard that climate change now concerns an ever larger proportion of Earth's inhabitants, impacting daily life through problems such as the shortage of water, food and other threats to health and well-being.

Space scientists have been tackling the challenge of understanding climate change trends and supporting efforts towards adaptation and mitigation using space-based and ground-based observation in conjunction with Earth simulation models.

The Plenary, entitled 'Space-borne observations of droughts and floods and their impact on water and food security', addressed the role of space applications in monitoring the causes, extent and socio-economic impacts of desertification and drought.

It also looked at which space-based Earth observation missions will improve the monitoring of these critical parameters to understand, for example, the growth of deserts and the types of data that will be of the greatest use in modeling desertification.

James Graf, Deputy Director for Earth Science and Technology at the Jet Propulsion Laboratory (JPL), provided an overview of the extent and the socio-economic effects of droughts and floods.

"Water is vital everywhere for life and it is the lack of water and drought that is affecting large parts of the world," he said. "Today, in China about 20 percent of its land mass is drought impacted."

Dr Graf explained that it was impossible to discuss drought without talking about the water cycle and many of space agencies are now putting up spacecraft that are looking at different elements of this.

He said it was important not to lose sight of what such data really means to the man or woman in the street - the bottom line being what the impacts on crops and food security are.

Dr Wu Bingfang, Head of Digital Agriculture in the Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, told delegates that China was well aware that its population was increasing dramatically which means a bigger demand on food production and natural resources.

“Droughts have increased significantly in China over the last 60 years and are a serious natural hazard when measured in terms of the number of people affected,” he said.

The Crop Watch project was started in China in 1998 and covers 31 main crop producing countries accounting for 85 percent of global production to help with the prediction and protection of crops.

“Using information from multiple sources we can estimate, for example, global grain supply which in turn can help with developing crop management policies.”

He said this had led directly in March 2004 to the Chinese government introducing a new policy in agricultural sector which has increased early rice production by over 20 percent.

Dr Masanori Homma, Executive Director of JAXA, spoke about the importance of space-borne monitoring in the context of global climate change which is seriously affecting water cycles and causing more frequent droughts and floods across the world.

He said that space-borne observations were helping to develop a countermeasure strategy.

“The nature of these issues means that international cooperation is important and JAXA is very proud to have operated the TRMM mission with the US for 16 years,” he said.

Rainfall is monitored by three sensors and by summarising data from this satellite we quantify global rainfall.

He said the GSMaP (Global satellite Mapping of Precipitation) global rainfall map, updated every hour using data from polar orbiting microwave radiometer/sounders and geostationary located infrared radiometers, was now freely available on the internet and showed movement of rainfall area and intensity.

Dr Homma said the Japanese Global Precipitation Measurement (GPM) satellite will be launched in 2014 to improve the accuracy of weather forecasts which will also support water resource management.

“The spacecraft will measure not only rainfall but also snowfall which is the reason that it has two types of onboard radar,” he said.

Dr Massimo Menenti, of ESA, said that in discussing the water cycle it was important to look at water management as opposed to monitoring demand or requirement.

"The problem is that in many parts of the world demand for water largely over rides natural cycle," he stated.

"What you see from current data and regional climate scenarios are changes in regional distribution of precipitation - the decision and ways water is managed can change the incidence of drought."

Dr Meneti explained that although satellite data is used in different ways, high resolution data is being increasingly used worldwide to provide information on water use - but the focus is on use rather than availability.

"Global data from satellites is used for global analysis but my argument is that we need something in between the two - important decisions also need to be taken on water availability at the point of use.

"Once this loop is complete we will end up in a situation where global models are much better linked to water usage," he said.

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