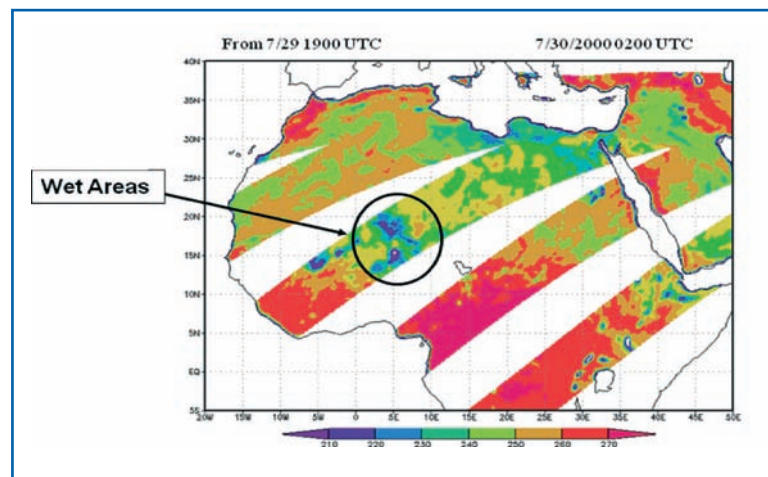


World Climate Research Programme (WCRP), Earth Observations and Droughts

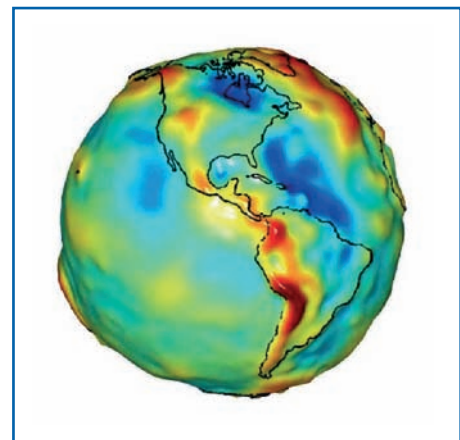
Description

WCRP, through its Global Energy and Water Cycle (GEWEX) Core project and its Cross-cut project on Extremes, has been undertaking work to monitor, understand and predict droughts. In particular, soil moisture products derived from AMSR-E and TRMM (Tropical Rainfall Mapping Mission) satellite data have been used to provide reliable estimates of upper layer soil moisture and are available on an experimental basis for monitoring drought over Africa. Local data are needed to assist in validating these drought monitoring products.



This chart shows surface wetness from TRMM data as an indicator of drought intensity (Courtesy of E. Wood).

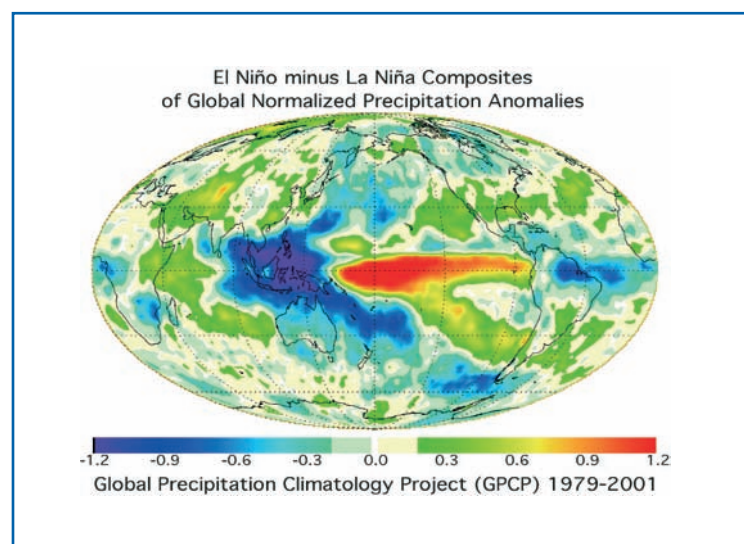
GEWEX is studying the factors that initiated, maintained and terminated a multi-year drought (1999-2005) in western Canada through the Drought Research Initiative (DRI). Satellite data are being used to study the effects of the drought on soil moisture, vegetation and ground water reserves. DRI also supports some model evaluation activities and a number of process studies including several concerned with groundwater-atmosphere interactions during droughts.



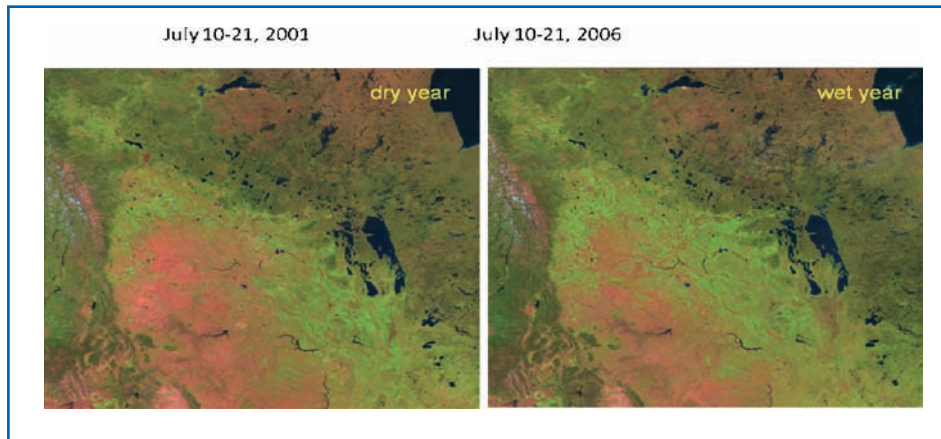
GRACE (Gravity Recovery and Climate Experiment) satellite data are being used to estimate the changes in the groundwater storage occurring as Canadian droughts develop (Courtesy of Ken Snelgrove).

Other GEWEX studies are assessing the adequacy of available climate and soil moisture products for characterizing drought in the semi-arid regions of the Canadian prairies and elsewhere. In addition, GEWEX has developed and produced a number of long-term global products derived from satellite data that allow scientists to monitor the severity of droughts and other climate anomalies.

Global Precipitation Climatology Project (GPCP) products are being used to assess the effect of anomalies in Sea Surface Temperature (SST) such as El Niño events on precipitation anomalies. (Courtesy of Bob Adler).



Several drought projects are using MODIS imagery to assess the extent of dry conditions. Collaborative work is being undertaken with agricultural agencies to identify the way in which drought thresholds can best be incorporated into their decision making processes. For example, the province of Alberta, Canada, makes use of NDVI products to determine whether or not farmers who have experienced forage losses in their pastures due to drought qualify for compensation from government insurance programs.



*MODIS satellite imagery showing the difference between a wet year and a dry year.
(Courtesy of A. Trishchenko)*

Within WCRP, drought prediction continues to be a central thrust of research for CLIVAR (Climate Variability and Predictability Project) and GEWEX as they study the roles of Sea Surface Temperatures and soil moisture in drought events. New projects on drought are being developed for eastern Asian and other semi-arid regions as part of the Coordinated Energy and water cycle Observations Project (CEOP)

In summary, remote sensing of the water cycle and surface conditions has become an essential tool in monitoring and predicting drought events. More effort is needed to ensure it benefits operational information systems as well as the research environment where it is being developed.