



The Climate Hazards group InfraRed Precipitation with Stations (CHIRPS) dataset and its applications in drought risk management

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A high quality, long-term, high-resolution precipitation dataset is key for supporting drought-related risk management and food security early warning. Here, we present the Climate Hazards group InfraRed Precipitation with Stations (CHIRPS) v2.0, developed by scientists at the University of California, Santa Barbara and the U.S. Geological Survey Earth Resources Observation and Science Center under the direction of Famine Early Warning Systems Network (FEWS NET). CHIRPS is a quasi-global precipitation product and is made available at daily to seasonal time scales with a spatial resolution of 0.05° and a 1981 to near real-time period of record. We begin by describing the three main components of CHIRPS - a high-resolution climatology, time-varying cold cloud duration precipitation estimates, and in situ precipitation estimates, and how they are combined. We then present a validation of this dataset and describe how CHIRPS is being disseminated and used in different applications, such as large-scale hydrologic models and crop water balance models.

Validation of CHIRPS has focused on comparisons with precipitation products with global coverage, long periods of record and near real-time availability such as CPC-Unified, CFS Reanalysis and ECMWF datasets and datasets such as GPCP and GPCP that incorporate high quality in situ datasets from places such as Uganda, Colombia, and the Sahel. The CHIRPS is shown to have low systematic errors (bias) and low mean absolute errors. We find that CHIRPS performance appears quite similar to research quality products like the GPCP and GPCP, but with higher resolution and lower latency. We also present results from independent validation studies focused on South America and East Africa.

CHIRPS is currently being used to drive FEWS NET Land Data Assimilation System (FLDAS), that incorporates multiple hydrologic models, and Water Requirement Satisfaction Index (WRSI), which is a widely used crop water balance model. The outputs (such as soil moisture and runoff) from these models are being used for real-time drought monitoring in Africa.

Under support from the USAID FEWS NET, CHG/USGS has developed a two way strategy for dissemination of CHIRPS and related products (e.g. FLDAS, WRSI) and incorporate contributed station data. For example, we are currently working with partners in Mexico (Conagua), Southern Africa (SASSCAL), Colombia (IDEAM), Nigeria (Kukua), Somalia (SWALIM) and Ethiopia (NMA). These institutions provide in situ observations which enhance the CHIRPS and CHIRPS provides feedback on data quality. The CHIRPS is then placed in a web accessible geospatial database. Partners in these countries can then access CHIRPS and other outputs, and display this information using web-based mapping tools. This provides a win-win collaboration, leading to improved globally accessible precipitation estimates and improved climate services in developing nations.