ALOS PALSAR IMAGE MOSAICS OF NORTH AND SOUTH AMERICA: AN IMAGE LAYER FOR WETLANDS MAPPING

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ALOS PALSAR, an orbiting L-band SAR launched by the Japanese Aerospace and Exploration Agency (JAXA) in 2006, has been pursuing a global observation strategy through its ALOS Kyoto and Carbon Initiative (ALOS KC). The objectives of the ALOS KC project, lead by JAXA, include systematic global scale acquisitions by ALOS PALSAR, and the production of products quantifying the geographic extent of forested, desert, and wetland areas. As a component of this task, large collections of dual polarization (HH and HV) data are being acquired over wetland areas around the globe. Through the NASA MEASURES program, JPL will be leading an effort to utilize this data to produce a global inundated wetlands product. One of the first steps will be to produce dual polarized continental-scale mosaics of SAR imagery. Image mosaics are desired to simplify image classification. However, flexibility in constructing the mosaic is required, in order to produce representative products. The first image mosaic results will be presented.

In assembling the ALOS SAR mosaics for the global inundated wetlands product, the mosaics will be orthorectified to the SRTM DEM (where available). The images to be mosaicked will be lower resolution image 'strips', often thousands of kilometers along track, rather than image frames which are roughly as long along track as the cross track dimension. These image strips are produced as a special product of the ALOS KC project by the JAXA Earth Observation Research Center (EORC), and have a pixel spacing of approximately 70 meters. These acquisitions also include the cross-pol channel, for which the same georeferencing information may be used to project the imagery to the ground topography.

In areas were SRTM DEM data does not exist, we will use the best available DEM that may be obtained for those regions.   All DEM data will be projected to the same projection and saved in the pixel spacing and format.

There are three key areas critical to the success of the mosaicking process. The first is accurate geolocation of the data, the second is accurate calibration of the data, and the third is the scientific order of preference for each image's appearance in the mosaic. Once the data is accurately geolocated and calibrated, the actual mosaicking of the data is a relatively trivial step.

In addition to the ALOS image layers, the underlying DEM, as well as incidence angle and date layers will be created. The imagery will be segmented according to well-known segmentation techniques with each segment classified. All image layers will be initially created as 1-degree by 1-degree (Latitude, Longitude) SRTM-like tiles at approximately 100 m resolution. Large-scale mosaics may then be constructed by assembling the 1-degree by 1-degree tiles.

The dual-pol mosaic of wetland areas and the resulting classification mosaic will be used when assessing the results for monitoring inundated wetlands through ALOS PALSAR ScanSAR acquisitions of these same areas. The more frequent scanSAR imagery will track the wetland dynamics of the imaged regions.