

GAP Filled

Description

Remote sensing time series data about the land surface, such as vegetation indices (NDVI, EVI2), energy balance products and land cover are useful for many characterization and change detection studies. However, these time series data records exhibit multiple spatial and temporal discontinuities that inhibit the proper and accurate study of the natural and gradual process of growth of land surface vegetation. These discontinuities, or gaps, are a result of cloud cover, atmosphere contaminants, shadow, presence of snow and the less than ideal the viewing geometry. A reconstruction of remote sensing time series data has to be implemented in order to have a continuous phenology curve. Inverse Distance Weighting and linear interpolation methods are implemented to fill the gaps.

Description

Gaps are filled using the Inverse Distance Weighting (IDW) method to estimate the vegetation index for the day of interest by using a moving window. The IDW method is based on the assumption that the interpolation should be influenced most by the nearby points and less by the more distant points. The following equation describes this method:

$$VI_j = \frac{\sum_i \frac{VI_i}{d_{ij}^n}}{\sum_i \frac{1}{d_{ij}^n}}$$

Where:

VI_i is the vegetation index value of the known points

d_{ij} is the distance to the known point

VI_j is the vegetation index value of the unknown point

n is a power parameter, user selects the exponent (often 1, 2 or 3)

The gaps are filled with IDW method using a moving window of 10 days

To eliminate outliers and minimize under/over performance of the Gap filling algorithm we're constraining the estimates by the 5-year moving window of the long term average. One standard deviation is used to restrict the boundaries of the values. Values outside these boundaries are replaced with the longer term average value and properly labeled in the output QA (Rank parameter).

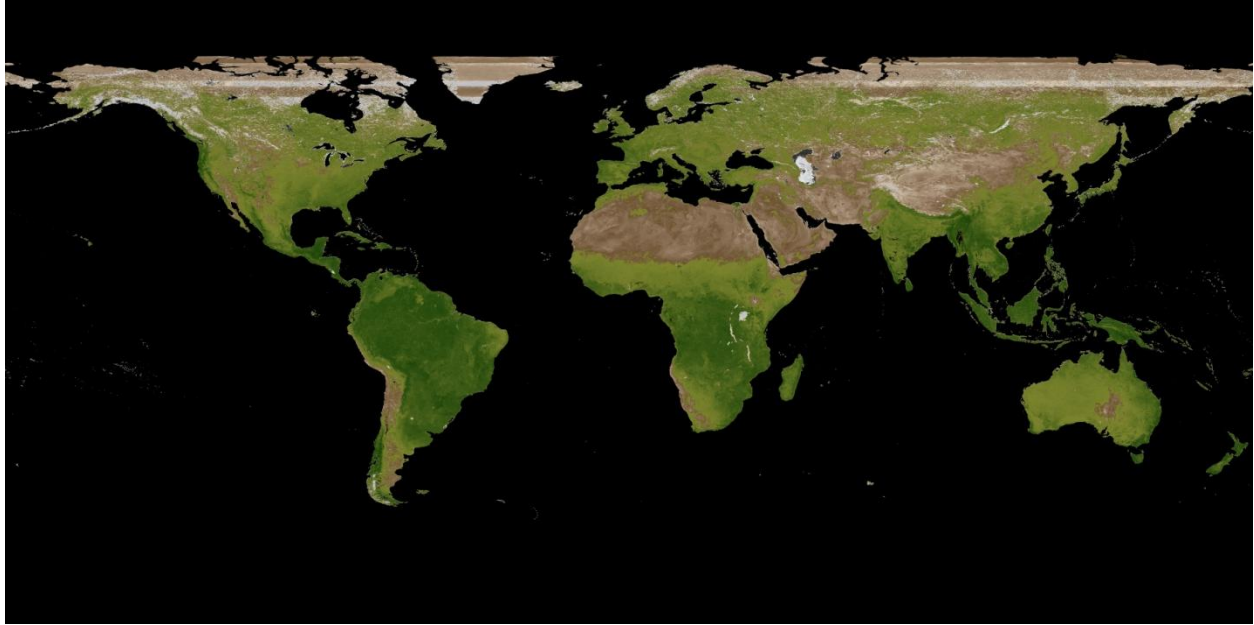


Figure 1: NDVI Gap filled (AVHRR, 1999, 15-days)

Data Set Characteristics

Temporal Coverage	1980-2010
Area	Global
File Size	~674 MB
Projection	Latitude/Longitude
Data Format	HDF-EOS
Dimensions	3600 x 7200 rows/columns
Resolution	0.05 degrees (5600 meters)
Location	/VIP/DATA/MEASURES/OUTPUT/GAPFilled

Limitations

These data show gaps because they were filtered. The user can use the non-filtered data.