ClimateTranslator with OpenClimateGIS

QED-2013 Workshop
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ClimateTranslator is a web framework developed by NCPP designed to simplify access to climate information.

Elements of the ClimateTranslator include CoG/ESGF search; the CoG collaboration environment; datasets and translational metadata; metadata viewers and editors; and a web interface exposing methods for the subsetting, computation, and reformatting of climate datasets.

The ClimateTranslator web interface is based on the OpenClimateGIS (OCGIS) Python toolkit - a standalone, open source software library enabling dynamic access to and manipulation of climate data.

Future work will better integrate the various elements of the ClimateTranslator.
Core Capabilities of OpenClimateGIS

- Read local or remotely served (i.e. OPeNDAP) ~CF-compliant netCDF datasets
- Geospatial subsetting by arbitrary vector geometries (e.g. watersheds) and time/level bounds
- Common spatial operations such as intersects, clip, and aggregation on point or polygon (e.g. bounded coordinates) data representations
- Geometry wrapping and unwrapping to maintain a “GIS-friendly” -180 to 180 longitudinal spatial domain
- Support for geographic (e.g. latitude/longitude) and projected climate datasets (e.g. Lambert Conformal)
- Option to apply temporally-grouped computations to data subsets
- Write climate data to GIS and tabular formats
The ClimateTranslator web interface uses OCGIS on the backend formatting user selections and executing a single call to OCGIS.

Functionality from the interface is available in the standalone OCGIS library.

A note on versions:
- OCGIS is in beta (v0.06b-snapshot-02)
- ClimateTranslator web interface is in alpha (v0.1a)
1. Extract a daily precipitation time series for all Tampa Bay watersheds for the year 1990

2. Base data will be the precipitation variable pulled from four downscaled and one observational dataset:
   - BCCA-GFDL
   - BCCA-CCMA-CGCM
   - ARRM-GFDL (Hayhoe)
   - ARRM-CGCM (Hayhoe)
   - Maurer02v2

3. Inspect output data and auxiliary files

4. Generate time series plot in R

5. Examine map of precipitation thresholds
Live Demo

http://hydra-ncpp.fsl.noaa.gov/ncpp/open_climate_gis/
user: ncppuser
password: qed2013
Precipitation Threshold for Tampa Bay Watershed Basins

ClimateTranslator Operations:
1. Select Precipitation (Pr) Data Package
2. Select 1990 in Time Selection
3. Select Threshold 9.62, gte
4. Set Calculation Group to Year+Month
5. Leave Aggregate checked
6. Check Calculate Raw
7. Select Shapefile as output

Count of Daily Precipitation Values >= 9.62 mm/day for July, 1990
(BCCA-CCMA-CGCM)
Future Work

- **ClimateTranslator web interface:**
  - Incorporate translational metadata
  - Web mapping and visualization capabilities
  - Enable CoG/ESGF search to populate the dataset selection
  - Custom configuration of data packages
  - Ability to apply multiple calculations as well as multivariate calculations (e.g. more than one dataset)
  - Improved help functionality

- **OpenClimateGIS:**
  - Expand calculation library
  - Unit-aware conversions and management
  - Additional output formats (e.g. KML, GeoTiff, PNG)
  - Integration with ESMPy (Python interface to the Earth System Modeling Framework) to provide regridding
Collaboration and Feedback

- We are open and eager to collaborate!
- Questions, comments, suggestions, or “hidden features”:
  - ClimateTranslator Interface: ct_support@list.woc.noaa.gov
  - OpenClimateGIS: ocgis_support@list.woc.noaa.gov
- All feedback is useful, so please do not hesitate to critique!
- Mailing lists and releases:
  - OpenClimateGIS: ocgis_info@list.woc.noaa.gov
- CoG Links:
  - http://www.earthsystemcog.org/projects/openclimategis/
  - http://www.earthsystemcog.org/projects/esmpy/