Geophysical Research Abstracts
Vol. 12, EGU2010-10995-1, 2010
EGU General Assembly 2010

GEOSS AIP-2 Climate Change and Biodiversity Use Scenarios: Interoperability Infrastructures

Stefano Nativi (1,2) and Mattia Santoro (1)

(1) Italian National Research Council (CNR-IMAA), Tito Scalo, Italy, {nativi,santoro}@imaa.cnr.it, (2) University of Florence at Prato, Prato, Italy

In the last years, scientific community is producing great efforts in order to study the effects of climate change on life on Earth. In this general framework, a key role is played by the impact of climate change on biodiversity. To assess this, several use scenarios require the modeling of climatological change impact on the regional distribution of biodiversity species.

Designing and developing interoperability infrastructures which enable scientists to search, discover, access and use multi-disciplinary resources (i.e. datasets, services, models, etc.) is currently one of the main research fields for the Earth and Space Science Informatics.

This presentation introduces and discusses an interoperability infrastructure which implements the discovery, access, and chaining of loosely-coupled resources in the climatology and biodiversity domains. This allows to set up and run forecast and processing models. The presented framework was successfully developed and experimented in the context of GEOSS AIP-2 (Global Earth Observation System of Systems, Architecture Implementation Pilot- Phase 2) Climate Change & Biodiversity thematic Working Group.

This interoperability infrastructure is comprised of the following main components and services:
a)GEO Portal: through this component end user is able to search, find and access the needed services for the scenario execution;
b)Graphical User Interface (GUI): this component provides user interaction functionalities. It controls the workflow manager to perform the required operations for the scenario implementation;
c)Use Scenario controller: this component acts as a workflow controller implementing the scenario business process –i.e. a typical climate change & biodiversity projection scenario;
d)Service Broker implementing Mediation Services: this component realizes a distributed catalogue which federates several discovery and access components (exposing them through a unique CSW standard interface). Federated components publish climate, environmental and biodiversity datasets;
e)Ecological Niche Model Server: this component is able to run one or more Ecological Niche Models (ENM) on selected biodiversity and climate datasets;
f)Data Access Transaction server: this component publishes the model outputs.

This framework was assessed in two use scenarios of GEOSS AIP-2 Climate Change and Biodiversity WG. Both scenarios concern the prediction of species distributions driven by climatological change forecasts. The first scenario dealt with the Pikas specie regional distribution in the Great Basin area (North America). While, the second one concerned the modeling of the Arctic Food Chain species in the North Pole area –the relationships between different environmental parameters and Polar Bears distribution was analyzed. The scientific patronage was provided by the University of Colorado and the University of Alaska, respectively. Results are published in the GEOSS AIP-2 web site: http://www.ogcnetwork.net/AIP2develop.