

Improved CarbOn cycle represeNtation through multi-sCale
models and Earth obseRvation for Terrestrial ecOsystems

The CONCERTO project aims to strengthen the European research ecosystem by creating an innovative scientific collaborative framework that enhances our understanding, monitoring, and modelling of the terrestrial cycle (CC), and leads to reduced uncertainty and ESM convergence. This framework has three main elements: the exploitation of novel Earth Observation (EO) data, the innovation of process models fed by these data, and Data Assimilation (DA) and Machine Learning (ML) techniques. The consortium includes European experts and institutes active in these areas. CONCERTO will advance the representation of land cover, leaf area index (LAI) and management intensity through new maps of high resolution with layers relevant for the CC. The new management map will enhance the creation of a new biomass production map. Further, CONCERTO will prepare for the ingestion of FLEX data in land surface models (LSM) through DA, and exploit Sentinel-5P/ TROPOMI HCHO indicative of biogenic volatile organic compound (VOC) emissions. As step towards moving away from prior (static) parameterizations, the novel P model will be used to ingest these new data sources. This will enhance understanding of ecosystems responses to climate extremes, fires, and vegetation recovery from them, and the parameterization of LSMs included in ESMs. Novel representations of the underrepresented processes of lateral carbon fluxes through outgassing of CO2 from rivers will be developed. Dedicated seasonal and climate experiments will demonstrate how improved representation of land surface processes benefit the accuracy and trustworthiness of global Earth System simulation. This will lead to better predictability of the influence of land management on the CC and underpin avenues towards carbon neutrality.

PROJECT DURATION

From January 1st 2025 to December
31st 2028

PARTNER

- FONDAZIONE CENTRO EURO-MEDITERRANEOSUI CAMBIAMENTI CLIMATICI (Coordinator)
- METEOROLOGICAL AND ENVIRONMENTAL EARTH OBSERVATION SRL
- SISTEMA GMBH
- EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS
- UNIVERSITEIT ANTWERPEN
- BARCELONA SUPERCOMPUTING CENTER CENTRO NACIONAL DE SUPERCOMPUTACION
- CENTRO DE INVESTIGACION ECOLOGICA Y APLICACIONES FORESTALES
- UNIVERSITEIT TWENTE
- INSTITUT ROYAL D'AERONOMIE SPATIALEDE Belgique
- POLITECNICO DI TORINO
- PENSOFT PUBLISHERS
- THE UNIVERSITY OF READING
- IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE

FUNDING INSTRUMENT

HE : HORIZON-CL5-2024-D1-01
Climate sciences and responses

BUDGET

Total funding: 9.874.252,50 €
Funding allocated to DIATI: 418.750,00 €

POLITO and DIATI's role:

Politecnico di Torino – DIATI is a member of the Consortium.
Scientific Supervisor: Prof. Carlo Vincenzo Camporeale

