Understanding the effect of environmental and climate change on sustainable coastal lagoon management

Potential and challenges for Earth Observation

ACHIEVING PROGRESS TOWARDS ENABLING A GLOBAL COASTAL LAGOONS COMMUNITY – The Lagoons for Life Roadmap for 2020-2022

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on behalf of the Lagoons for Life community
“Future vision and knowledge needs for coastal transitional environments”
Lagoons for Life (L4L)
An international initiative by scientists in the natural and social sciences, including EO scientists

Transdisciplinary

Initial Workshop

**Theme 1:** Lagoon monitoring and management issues

**Theme 2:** The potential of EO for coastal lagoon monitoring and management

**Theme 3:** Challenges posed and potential solutions towards future research
Questions to address

**Theme 1: Lagoon monitoring and management issues**

- What have been the main **trends** in coastal lagoon systems (ecological processes and human pressures) over the past decades, and can we **forecast** how these trends will develop in the future?

- How does climate change affect lagoons and what are the current **impacts** of the later?

- What are the critical aspects we (yet) need to understand on the compounding **effects** of climate change and environmental change in lagoons?

- What are the implications of human pressure, such as marine and land pollution, and increasing resource demand and exploitation, on lagoon **sensitivity** to environmental and climate change?
Questions to address

Theme 2: The potential of Earth Observation for coastal lagoon monitoring and management

• Are the current ESA CCI ECVs suitable for global coastal lagoon monitoring and environmental assessments? How can we add value to the ECVs by combining these with other data (EO, *in situ*, socio-economic, *etc.*) for investigations of the social and biophysical coupling processes in lagoons?

• How can EO support international conventions and agreements in their efforts towards improving sustainable development of lagoon, and lagoon-neighbouring, regions?

• Can EO and ESA CCI ECVs help improve indicators used to evaluate and monitor lagoon systems in line with achieving the UN Sustainable Development Goals, especially SDG6, SDG14 and SDG15?

• What information and datasets are required to support (inter)national policy instruments in lagoon systems (e.g. protected areas, payment for ecosystem services, certification systems, *etc.*)?
Questions to address

Theme 3: Challenges posed and potential identified solutions towards future research

• What are the challenges in employing EO in lagoon ecosystem studies and what knowledge gaps still exist? Which thematic datasets are further required?

• What type of field data are required to validate EO products and study change in lagoon ecosystems, and how can the scientific community derive those?

• What are the obstacles in integrating EO data in lagoon management strategies?

• Can the Copernicus Sentinel-series help overcome challenges in lagoon ecosystem assessments?
Evaluate the potential and challenges for EO in coastal lagoon monitoring and management

- Introduce new methods to traditional approaches
- Exploit vast amount of information available from EO

Create a centralised global inventory of lagoon data and research initiatives

- Identify gaps in data and knowledge

Strengthen joint research activities between international EO and coastal zone/coastal lagoon research communities

- Bridge EO with non-EO sciences
- Bridge natural with social sciences

Co-design lagoon management strategies under the umbrella of the UN SDGs, Paris Agreement, Aichi Targets and Sendai Framework, etc.

- Develop holistic approaches
- Sustainable coastal lagoon management

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EO
In situ Ex situ
In vitro
Models
Paleo-data
Theoretical frameworks
Stakeholder knowledge

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www.lagoonsforlife.com
International programmes and initiatives:
  Future Earth Coasts (FEC)
  Sustainable Water Future Programme (SWFP)
  International Geosphere-Biosphere Programme (IGBP)
  Community Surface Dynamics Modeling System (CSDMS)
  World Climate Research Programme (WCRP)
  Group on Earth Observations (GEO) Blue Planet
  Integrated Marine Biosphere Research (IMBeR)
  UN Environment GEMS/Water Capacity Development Centre

National space or research agencies:
  German Aerospace Center (DLR)
  US National Oceanic and Atmospheric Administration (NOAA)

National centres, networks and institutes:
  Venice Resilience Lab – Wigwan Local Community
  National Marine Fisheries Research Institute (NMFRI), Poland
  Hellenic Centre for Marine Research (HCMR), Greece

Universities:
  Università degli studi di Parma, Italy
  Università degli Studi di Trento, Italy
  University of Stirling, United Kingdom
  University College Cork, Ireland
  University of Algarve, Portugal
  Stockholm University, Sweden
  University of Waterloo, Canada
  University of Colorado, USA
  University of Cambridge, United Kingdom
  University of Dundee, United Kingdom
  Marine Research Institute, Klaipeda University, Lithuania
  University of Lisbon, Portugal
  University of Patras, Greece
  Drexel University, USA
  University of Murcia, Spain
  University of Portsmouth, United Kingdom

Industry and SMEs:
  Brockmann Consult GbmbH, Germany
  Odermatt & Brockmann GbmbH, Switzerland
  UK NERC Plymouth Marine Laboratory (PML)
Achievements

1. An active community:
   • Use of social media and L4L website
   • Networking at meetings
   • New research projects, e.g. H2020 CERTO (presented yesterday)
   • 2018 ASLO Summer Meeting Special Session: “Unlocking the potential of Earth Observation in coastal lagoons and estuaries”

2. Identification of key study areas and development of preliminary fieldwork plans towards pilot studies:
   • 14 coastal lagoons were identified as case studies
   • Preliminary survey identified sites that are well described and others that aren’t
   • List of available datasets and data sources

3. Publications:
   • White Paper drafted
   • Academic journal publication in preparation

4. Collaborative research funding proposal focused on addressing key gaps, opportunities and drivers:
   • H2020 CERTO (Copernicus Evolution: Research for harmonised Transitional water Observation)
Set clear targets and milestones to better coordinate tasks and activities
# Map key actors and discuss partnership avenues
# Link with GEO Initiatives and Community Activities, e.g. GeoGLoWS, DELTA&ESTUARY, AquaWatch, EO4SDG

Increase network and link with other relevant initiatives
# Continue to work on global inventory
# List past and existing projects
# Distribute survey

Increase awareness through events, sessions and publications
# Target specific events and organise participation through the L4L network

Inventory of data and information, Identify and address gaps
# Foster new ideas, research, solutions
# Identify research opportunities
# Discuss collaborations within and outside L4L network

Lagoons for Life mini workshop
Friday 24th January 2020
ISMAR, Venice
14:30-17:30
With thanks

Sustainability of the World’s Coasts
TRANSITIONING TOWARDS RESPECTFUL CUSTODIANSHIP OF OUR COASTS

futureearth.coasts
land-ocean interactions in the coastal zone

Our Coastal Futures
Transitioning towards a respectfu custodianship of our oceans and coasts

19-22 October 2020
Southern Cross University
Gold Coast, Australia

https://coastalfuturesconference.com

# FEC's new leaflet