Space Climate Observatory
Tackling the impacts of Climate Change at the right scale of Population

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Need for a coordinated assessment of Climate Change Impacts

Potential effects of climate change

Source: Climate Change Impacts in the United States: The Third National Climate Assessment

What are we going to do?
Societal Impacts

Environmental Degradation
Forced migration, civil conflict, mental health impacts, loss of jobs and income

Extreme Heat
Heat-related illness and death, cardiovascular failure

Severe Weather
Injuries, fatalities, loss of homes, mental health impacts

Water & Food Supply Impacts
Malnutrition, diarrheal disease

Degraded Living Conditions & Social Inequities
Exacerbation of existing social and health inequities and vulnerabilities

Changes In Vector Ecology
Malaria, dengue, encephalitis, hantavirus, Rift Valley fever, Lyme disease, chikungunya, West Nile virus

Air Pollution & Increasing Allergens
Asthma, cardiovascular disease, respiratory allergies

Water Quality Impacts
Cholera, cryptosporidiosis, Campylobacter, leptospirosis, harmful algal blooms

IMPACT OF CLIMATE CHANGE ON HUMAN HEALTH & EXACERBATION OF EXISTING INEQUITIES

Rising Temperatures
More Extreme Weather
Increasing CO2 Levels
Rising Sea Levels

Adapted from CDC, J. Fett
Unique Value provided by the GEO SCO Initiative

“Space Climate Observatory”
A world observatory of the climate change and its impacts

- **Satellite data**
  - Earth observations at regional, national and local level
  - … and in-situ data, research modelling

- **Climate change and its impacts**
  - Humankind, both as anthropogenic causes and as the victims of the impacts (temperature increase, sea level rise and hazards…)

- **a joint Observatory**
  - A World Heritage system

→ [http://spaceclimateobservatory.org](http://spaceclimateobservatory.org)

- Respond to Adaptation needs through international coordination
- A global monitoring of CC impacts is so far poorly structured
- Case studies in various contexts have been developed but
  - Many methodological approaches are challenging and/or not shared
- Contribute to the assessment of impacts of CC in different SBA (water, food security, coastal areas, air quality…)
- Precise impact’s CC monitoring
  - Regional, National, Local scale
  - Will raise awareness, stimulate and support decision making
  - Crosscutting with socio-economic data and also Human and Social science

Required international coordination specifically focused on impacts of Climate Change

October 2018 : CEOS Statement of Space Agency Contributions in Support of the Paris Agreement : Adaptation : confirm the crucial role of space observations and Their role helping to establish facts that can be used to determine key impacts on vulnerable sectors, geographical zones, and also incurred cost resulting …
Unique Value provided by the GEO SCO Initiative

• Need to adopt the high-quality standards and guidelines that have been developed (in particular in the frame of WG Climate for the production of the ECVs) (for all information generated within SCO). Important for the credibility of the community and the consistency of the communication.

• By making full access, use and benefit of multi-source data
  - Best use of synergies between data providers (from satellite, in-situ, model, socio-economic research)

• Co-construction of both knowledge and expertise (scientifically, technically and geographically)

• SCO could be a unique opportunity (“multiplier”) to “industrialize” or “replicate” local climate change impacts studies / use cases and generalize them massively.

• SCO is seen as a means to also catalyze national coordination and effort on CC impacts;

• Develop effective and relevant communication/outreach activities and educational measures
  - Will raise awareness, stimulate and support decision making

• SCO is seen as a very good way to obtain more feedbacks from end-users, maximize the use of CDRs and gain insight into the needs for future space programs and related observations (e.g. develop of new indicators).
Key Results Achieved in 2017-2019 by the SCO

- SCO one of the 12 commitments of the One Planet Summit
- Dedicated resources from CNES, IRD and French National Research Institutions (CNRS, MF) Staff
- CNES project with a dedicated budget and related organization
- On-line Demonstrator (Proof of concept) : www.spaceclimateobservatory.org

- Portfolio of climate change impact case studies around the globe
  Global warming, heatwaves and urban hothouses,
  Glaciers melting faster, sea level rise impact at the coasts,
  Pollutants and green gases, impact on city air quality,
  More frequent droughts: impacts on agriculture and water resources management,
  Extreme events, precipitations and floods, Freshwater reserves.

- Signature of an agreement between CNSA and CNES for the implementation of the SCO
  and several LOI with partners

- SCO 1st International Meeting – CNES HQ Paris, 01/02/2019
  Representing more than 25 national Space and National agencies, and 4 international organizations
  Very fruitful interactions which clearly demonstrates a common willingness to act together towards a
  common goal → joining forces and collaborating to address the monitoring of climate change impacts

- Signature of the SCO Joint Declaration of Interest, Le Bourget - June 17, 2019

- Set up Steering Committee

GEO SYMPOSIUM 2019
Impact of climate change on sea level rise and the coastal vulnerability of the South-East French coast in Palavas-les-Flots

Altimetry, imagery, geodesy: 34 satellites in play to observe seas and coasts.

Sea level rise from 1993 to 2017
Sea level and DEM combination for the assessment of the local vulnerability to submersions under 1 m rise in sea

DTM made from a couple of Stereoscopic Pleiades images

Modeling of the 1983 storm (c)
R. Pedreros, S. Lecacheux, C. Vinchon - BRGM

Sea level and DEM data combination for the assessment of the local vulnerability (Simulation of the 1983 storm + 35 cm)

• Le Cozannet G., Garcin M., Yates M., Idier D., Meyssignac B. (2014), Approaches to evaluate the recent impacts of sea-level rise on shoreline changes, Earth-Science Reviews, 138, 47-60. doi: 10.1016/j.earscirev.2014.08.005
Impact of medium/high sea level scenarios


With +1m Sea level rise, the entire urbanised sand-spit could be almost completely flooded during a 1983-like storm!

Simulation of 1983 storm
+1m Sea level rise

Courtesy of R. Pedreros, S. Lecacheux, C. Vinchon (BRGM)
Key Milestones and/or Deliverables for 2020-2022

- SCU Steering Committee
  - Put in place the different governing structures (General Assembly, Scientific – Users - Observers Committees)
  - Consolidate its International cooperation: coordination with international bodies
  - Executive Secretariat

- Develop international cooperation (agreements and partnerships)

- Set-up the International SCO portal and the related regional/national portal /platform
  - Sharing input data, protocols, knowledge and processing methodology
  - Improving global knowledge and awareness about the impacts of CC – available to all
  - International coordination
  - Facilitating agreements between different initiatives and partnership
  - Methodology reproduced, adapted in quasi similar contexts
  - SCO missions/objectives will be deployed in each country by national stakeholders through their dedicated infrastructure and organization

- Collect and catalogue different topical impact case studies

- Present concrete realizations in areas defined as “proofs of concept” between partners

- Full description of Climate Change impact Case Studies performed
  - Climate change impact descriptive sheets
  - Open source code implementing the specifically designed impact study
Good Practices and/or Lessons Learned

- The need to have the involvement from the beginning the right stakeholders
- Essential to build upon local (e.g. traditional knowledge) / national expertise / tools / initiatives / infrastructures
- The best state art of the science: knowledge trust
- Easier coordination (e.g. implementation of regional RI Datahub/platform)
- Methods and best practices transferable.
Requests for Assistance

• International coordination: the need to rely on GEO support and networking

• Permanent contact on climate change impact at GEO Secretariat would be useful

• Synergies between SCO and other GEO Initiatives to amplify involvement of the GEO community

• Extend the list of partner countries

• Coordination and assistance need on the use of citizen science data
Contact

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