

Observing from the outside, you **feel** part of the inside

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L'être de l'humain est géographique

Augustin Berque, *Ecumène. Introduction à l'étude des
milieux humains*. Belin 2009

A research program on Space & Society

- A research program in social sciences on the relationships between space activities and societal challenges.
- A partnership between researchers and engineers
- A book published in 2014 " Observing the Earth from space. Space data-social and political stakes " .
- Agenda for 2015, co-working on the relationship between " climate" and "space activities ".

Addressing the links between space activities, environmental issues & climate

- Historically relationships have been close on two levels :
 - Representation and Imagination,
 - Framing issues and knowledge.
- For the lay public "climate" (with global warming as a catchword) has become the iconic for the environmental issues.
- Even though we address the climate as a global issue, it can only be grasped by actors at a local level.

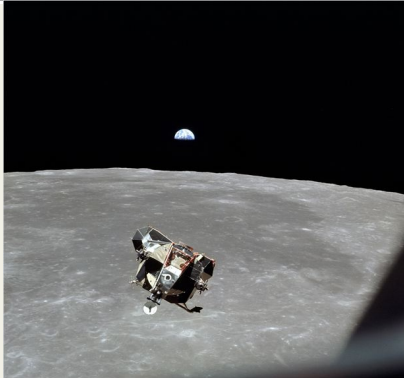
For us the issues are : How could space contribute now ?
How could research in social sciences help us to understand this challenge ?

Space & Society

- Historically, space activities have been driven by defence and science goals which involved quite specific communities, and national governance.
- They were considered as expert activities for producing information and knowledge for policy decision.
- From the perspective of policy for sciences, the lay public has been considered as an audience to be educated or made to dream in order, if necessary, to justify space investment.
- Imagery has been used as a " dream machine ".

Space and Environment

- The development of environmental issues has been intertwined with the development of space observation. (Lambright 2005,2007; Conway in Dick& Launius, 2007)
- The rise of environmental social mouvement has been (partly) attributed to the circulation of space imagery (review in Corfee Morlot et alii 2007)
 - Images of Earth seen from the moon
 - Earth as a whole,
 - Earth as a lonely, fragile planet
 - Earth as the end of the frontier
- But, the environment has many levels of complexity and several overlayed meanings that may be scientific, social and political.

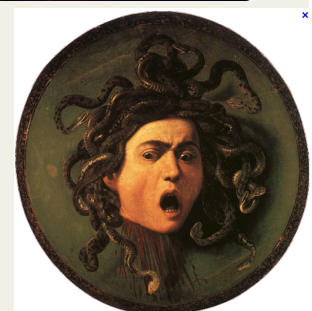


Blue marble from Apollo 17 as a fascinating view for a Narcissic humanity



View of the Earth as a small point in the universe,
creating a "medusa " effect, psychic sideration, staggering.

And a need to understand and to get cognitive grip,



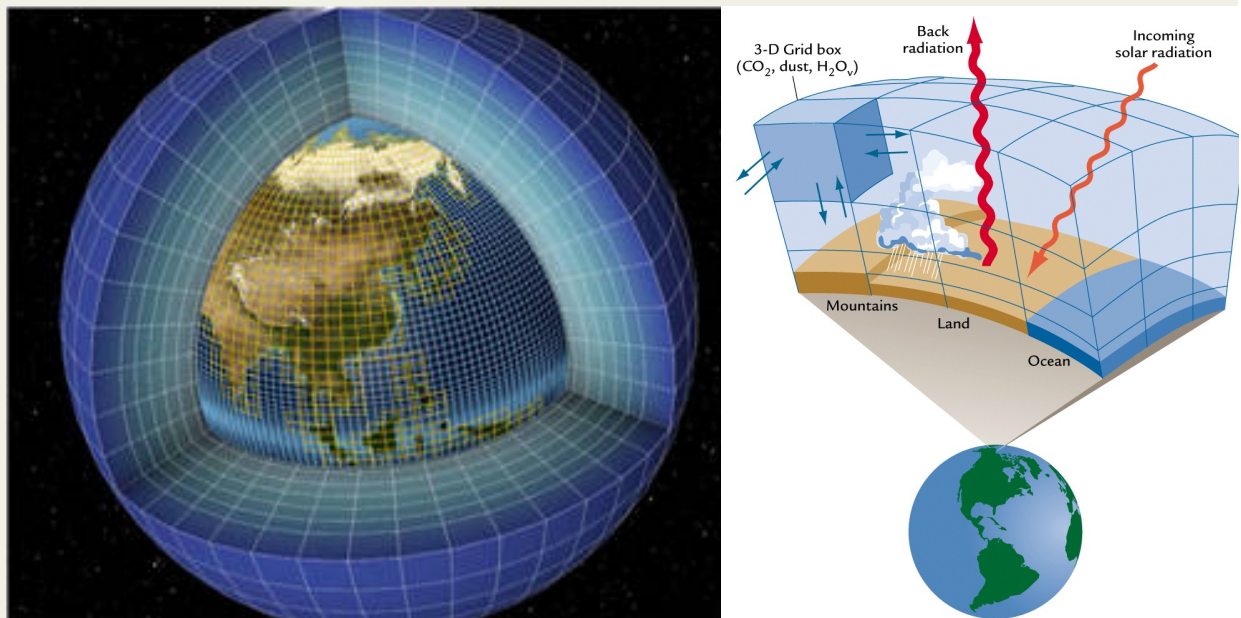
How space addresses climate as a scientific object

(Cf. Gemma Cirac Claveras PHD)

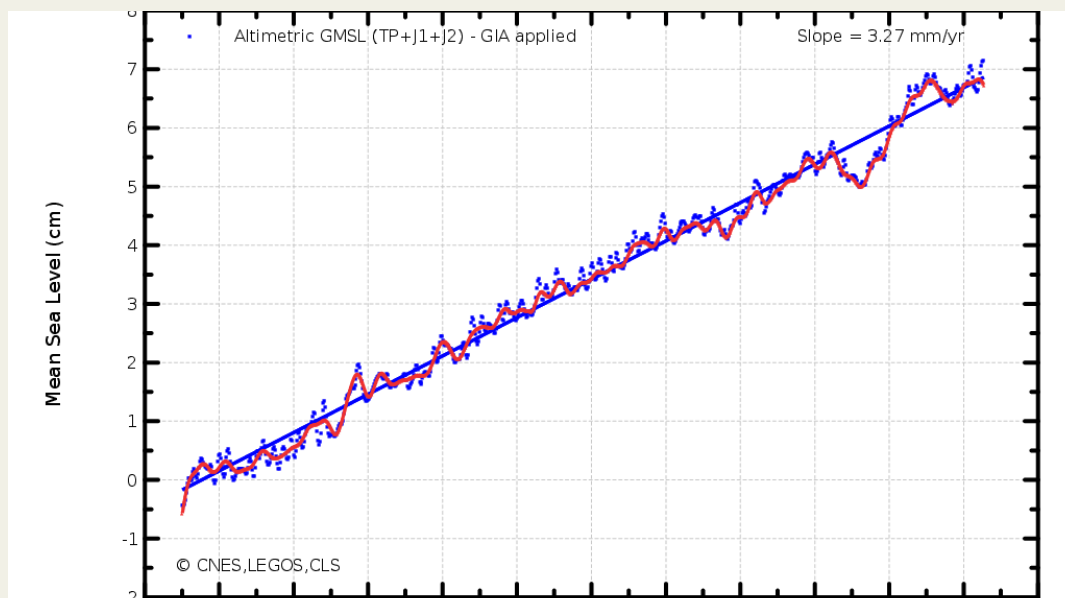
- From morphological representations ("images" for the eye) to physical measurements.
- Physical measurements ("pm ") enables the building of data ("data produces data ") : Space pm + algorithms + in situ pm + calibration + models + ...----}- data
- Data becomes an object in itself :
Building a hierarchy of data : the levels of data : instrumental data, physical measurements (radiance, propagation delays...) (for measurement experts), geophysical data (for general Earth scientists) Individual data and long-term time series of data
- Data definition interacts with data uses :
From the age of individual data (physical data for the space measurement experts, geophysical data for the earth scientists) to the age of data series for models (back to raw data, importance of long term archives and intercalibration...). Raises the question of users, uses and representations

...and Data from very far outside :

Proof of the existence of a strong water cycle on Mars opens the way to new representations (on long term evolution)/debates

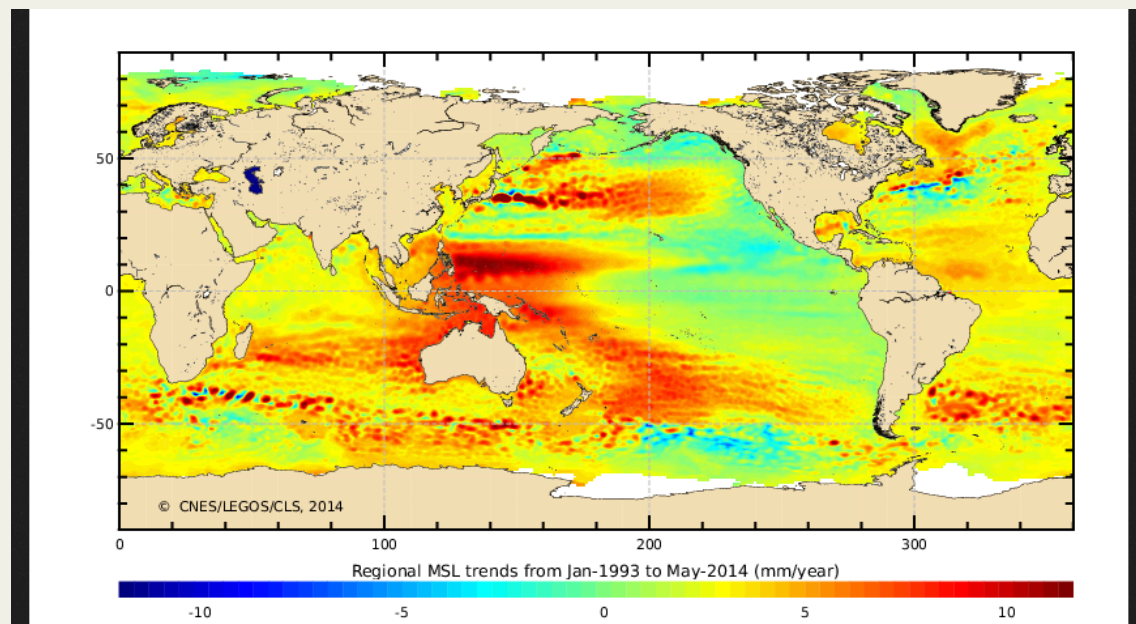


Representing climate processes, " drawing " potential futures



Sea level measurement as "touching »
to see wether it's real, like St Thomas.

But, it doesn't stop controversies.



Giving regional information as a representation of mean sea level trends

Space and climate

- Climate change process includes some specific characteristics such as :
 - It is global and " invisible "
 - It is linked to anthropic activities and though social object but very difficult to grasp at a human scale
- Then, Space can contribute significantly to this monitoring :
 - Earth Observation from space provides a consistent global view of the earth thanks to the geometry and dynamics of satellite trajectories
 - Multiple parameters associated with climate can be measured/monitored from space :
 - Atmosphere : Aerosol, Cloud, Ozone, Greenhouse Gases (CO₂ and methane),...
 - Ocean : Sea Level, Sea Surface Temperature, Ocean Colour, Sea Ice,...
 - Land : Land Cover, Fire, Soil Moisture, Ice Sheets (Greenland and Antarctica), Glaciers, ...

Several indicators computed from space measurements such as mean sea level change or sea ice decrease have played a key role in the public's and decision makers' awareness of climate change
- Space cannot however address the complete set of climate change issues by itself :
 - Intrinsic limitations of space measurements : physic, resolution, coverage
 - Necessity to combine multiple sources of information at global and local scale for public awareness and decision making

Addressing " climate " as a social challenge

- With the emergence of environmental concerns, the public is demanding the means to adress " global warming " as a social issue (Walk the climate, 21 September).
- Different research initiatives attempt to address uncertainty and adaptation (such as those of GIS Climat)
- Scientists in the Cordex programme are involved in experiments with deciders and end users in order to deal with Climate as both scientific and local social issue. And local issues are also complex. (CORDEX 2013)
- In a "science for policy" perspective, deciders ask for information and resources to enable them to act and control by developing services. Thus Space activities are enlisted in climate-services building process. (Copernicus)
- Our question remains: how does space contribute to this process?

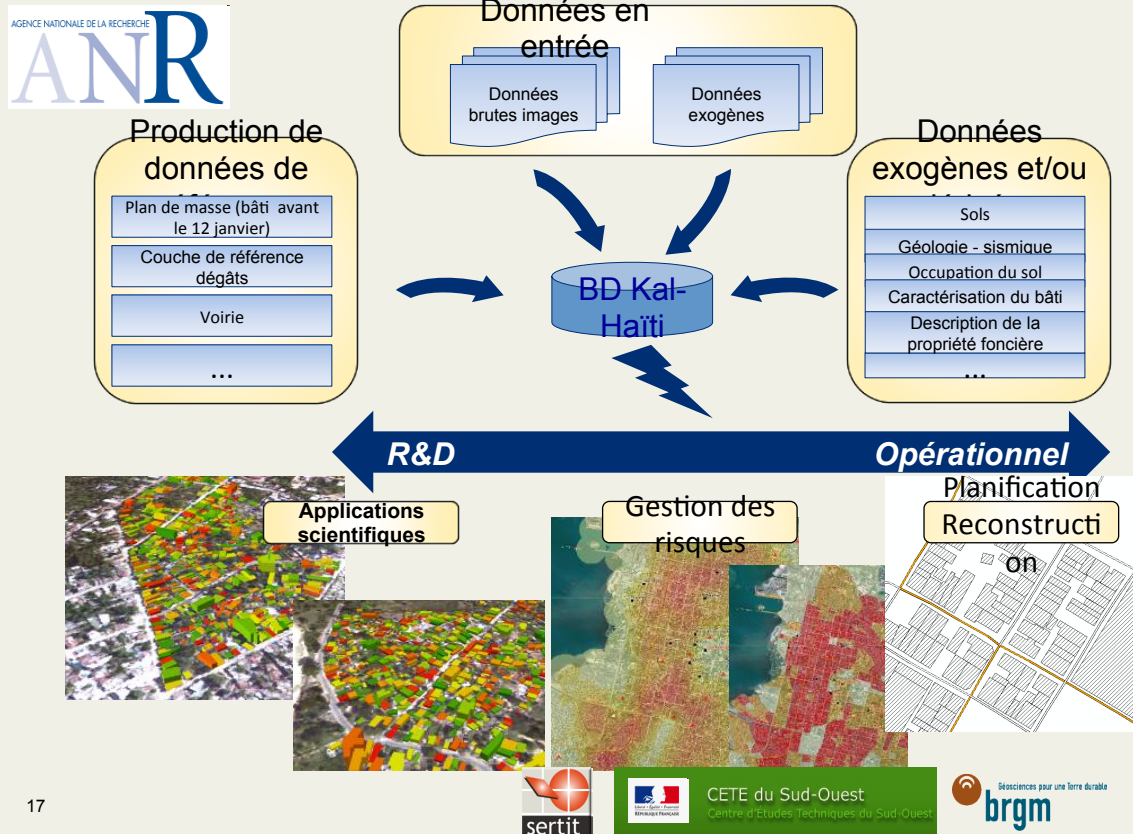
How tackle the climate issue at a local scale ?

- There are controversies about the monopoly of the global framing of climate (Tsing) versus the more hybrid frame of Biodiversity.
- There are discussions about the effectiveness of communicating at a local level about projections full of uncertainty (Chateauraynaud Debaz). Risk of " Aquila effect ".
- For the lay public, " Climate " has several meanings. It relates to culture, to matters of concern...Each one interacts with various milieux (Berque, Chateauraynaud et Debaz) and their priorities are not stable.
- Some suggest moving from a focus on " simple answers " or " visions of futur " to empowering people by addressing global warming as a multilevel risk (Corfee-Morlot et al.) ie Monitoring vulnerability within a local context.

Which experiments have been undertaken up to now with the aim of empowering people ?

- Consolidating local intuitions with global understanding :
 - Example of people from mountain villages who wanted to consolidate assumptions after a collection of local facts with knowledge built by global observation such as MSL.
- Articulating different levels of observation :
 - Example of WWF about biodiversity, kind of cross-matching facts collected locally with the human eyes observation, and facts built by observing from above.
 - Knowledge established by observing from above and combining with experience accumulated by actors on the ground in a given situation.
- Learning from KALHaïti research base for risk and recovery. This model could inspired the joint building of observatories on vulnerability to climate change.
- The used of space (as a complement to airplane or drone) for following evolution at a meso or local scale. It could provide actors with a global view of a dynamic situation.

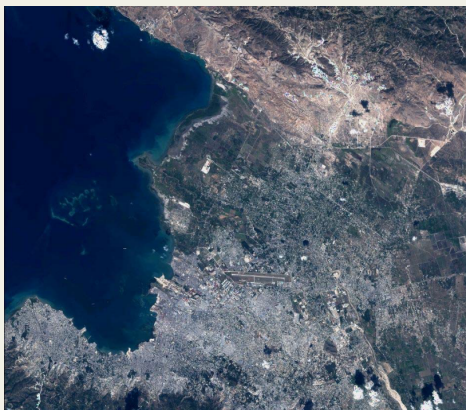
Kal-Haïti BD support à reconstruction durable



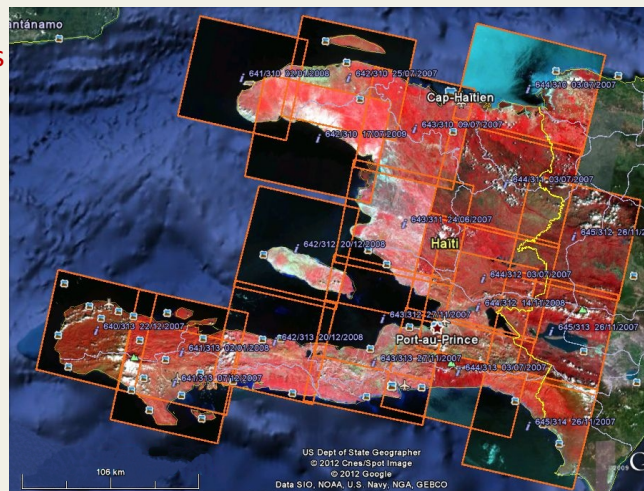
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BD support à reconstruction durable Haïti

- Imagerie optique THR et HR **Pléiades** 50 cm, **SPOT 5** 2.5m C, **SPOT 4** 20m
- MNT HRS** Spot 5 à 30 m (SO Haïti), **MNT SRTM** à 90 m
- Données **vecteur**/shape file
- Points d'appui (**GPS OSM**)



Pléiades 1A – Port-au-Prince 12/2011 (50 cm ré-échantillonné)



Mosaïque Spot 5 à 2.5m C (2011)

Données existantes ou planifiées :

- GeoEye, QuickBird, ERS, **PALSAR**, TerraSAR-X
- Photographies aériennes, MNE local (LIDAR ou images THR)
- Programmations Spot 5 et Pléiades

La télédétection pour construire des représentations du territoire

- **Vulnérabilité du bâti au ruissellement**

- Projet mené pour la **Croix Rouge Française**.

- Objectif: fournir aux humanitaires un **support cartographique sur mesure** (gestion des risques, dimensionner/planifier les opérations)

- Contributions KAL-Haiti :

Evaluation des risques de ruissellement sur 407 hectares en zone urbaine ; données spatiales THR, MNT et MNS.

Identification chemins en eau

Vulnérabilité de 2300 bâtiments.

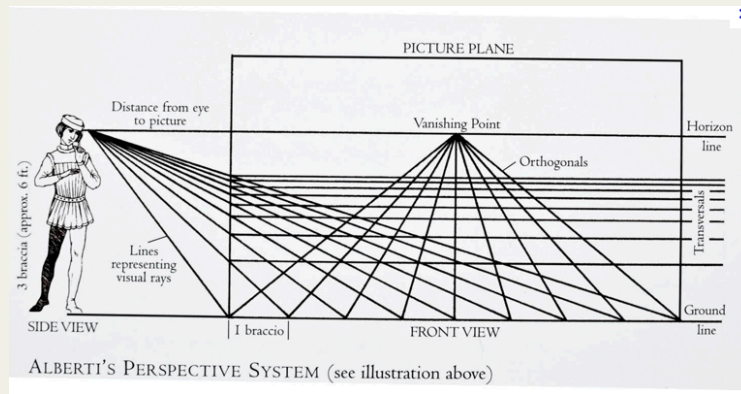


Some questions are on our agenda for next year

- Framing /re-framing the issue in order to
 - Represent the knowledge.
 - Articulate (intertwine ?) different kinds of knowledge, perceptions, experience
- Exploring various meanings of Environment (Ingold, Berque)

Umgebung, the given world vs *Umwelt* , specific arrangement configured by each species (Von Uexküll). Fûdo, (Watsuji) Fudôsei (both " *existential structure*" et " *contréité*") Médiance.
- Exploring various representations of « perspective »

Perspective Renaissance (focus on one point, Alberti), Traditional Japanese drawing (several focuses within the same image, *Ukiyô*, boudhism, floating world, impermanency as reality)Hokusai, Monnet (western and japanese cross fertilization)



Observing, representing, interacting



« Il n'est pas de lieu sans être,
il n'est pas d'être sans lieu d'être »

Augustin Berque, « Ba. Le lieu » in
Bonnin P., Matsasugu N., Shigemi
I., *Vocabulaire de la spatialité Japonaise*.
CNRS editions, 2014

And that's it !