

Impacts des changements climatiques sur les ressources et les écosystèmes aquatiques



Dr Anthony Lehmann

*Institut des Sciences de l'Environnement de l'Université de Genève
& Programme des Nations Unies pour l'Environnement*

www.unige.ch/climate

Et si Chappatte avait déjà tout dit?



Impacts des changements climatiques sur les ressources et les écosystèmes aquatiques

1. CHANGEMENTS CLIMATIQUES:
L'HEURE N'EST PLUS AUX DOUTES!!!

2. SCÉNARIOS:
QUELLE SOCIÉTÉ POUR LES GÉNÉRATIONS FUTURES?

3. IMPACTS SUR L'EAU:
L'EXEMPLE DU LAC BALATON EN HONGRIE

4. IMPACTS SUR LA FAUNE AQUATIQUE:
RIVIÈRES DE SUISSE

5. IMPACTS SUR LES RÉGIONS DE MONTAGNE:
LE PROJET EUROPÉEN ACQWA

6. IMPACTS SUR LE BASSIN DE LA MER NOIRE:
LE PROJET EUROPÉEN ENVIROGRIDS

7. QUELQUES CONCLUSIONS...

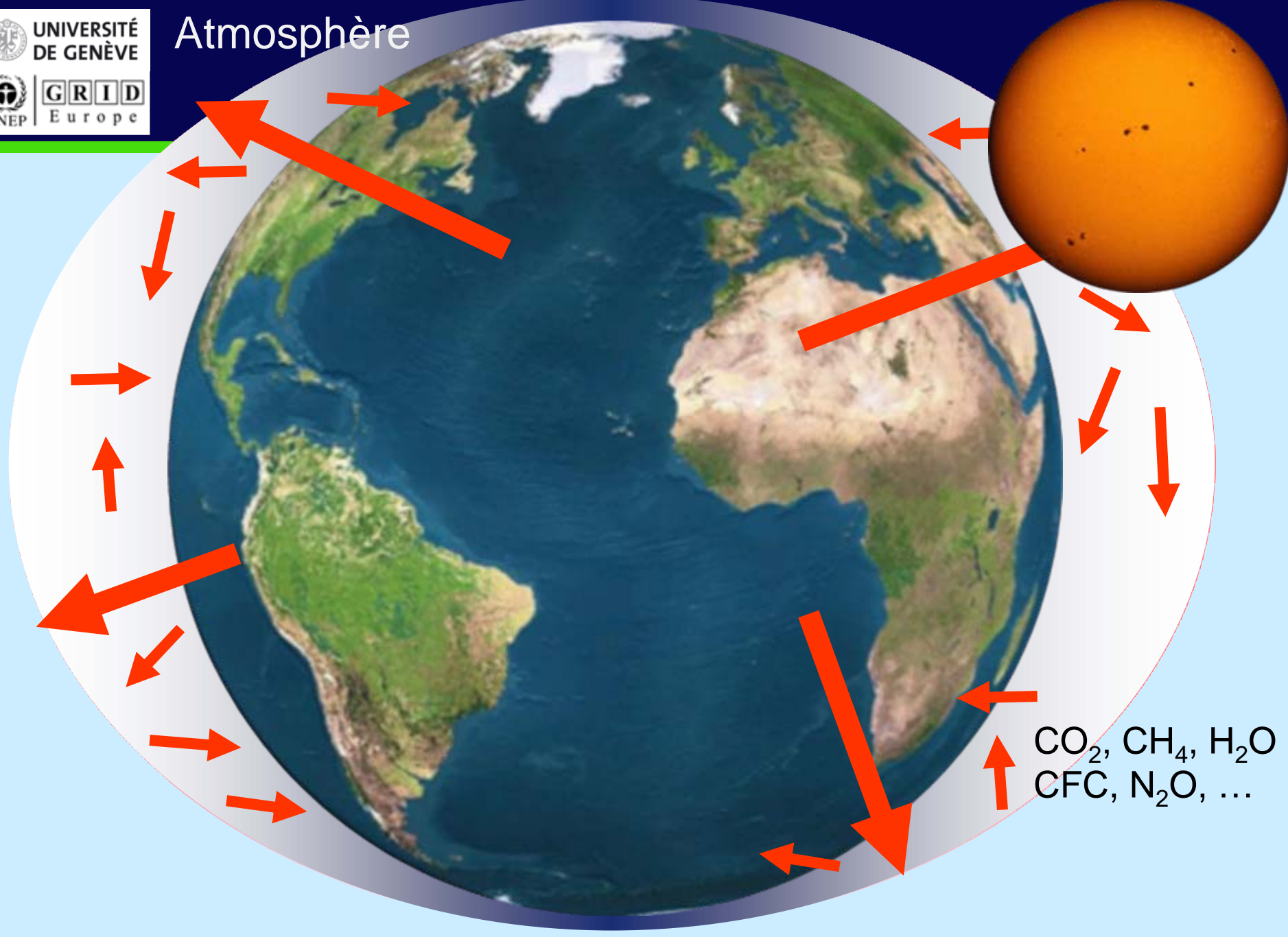
1. Changements climatiques: l'heure n'est plus aux doutes!

Radiations
infrarouges



Radiations
solaires

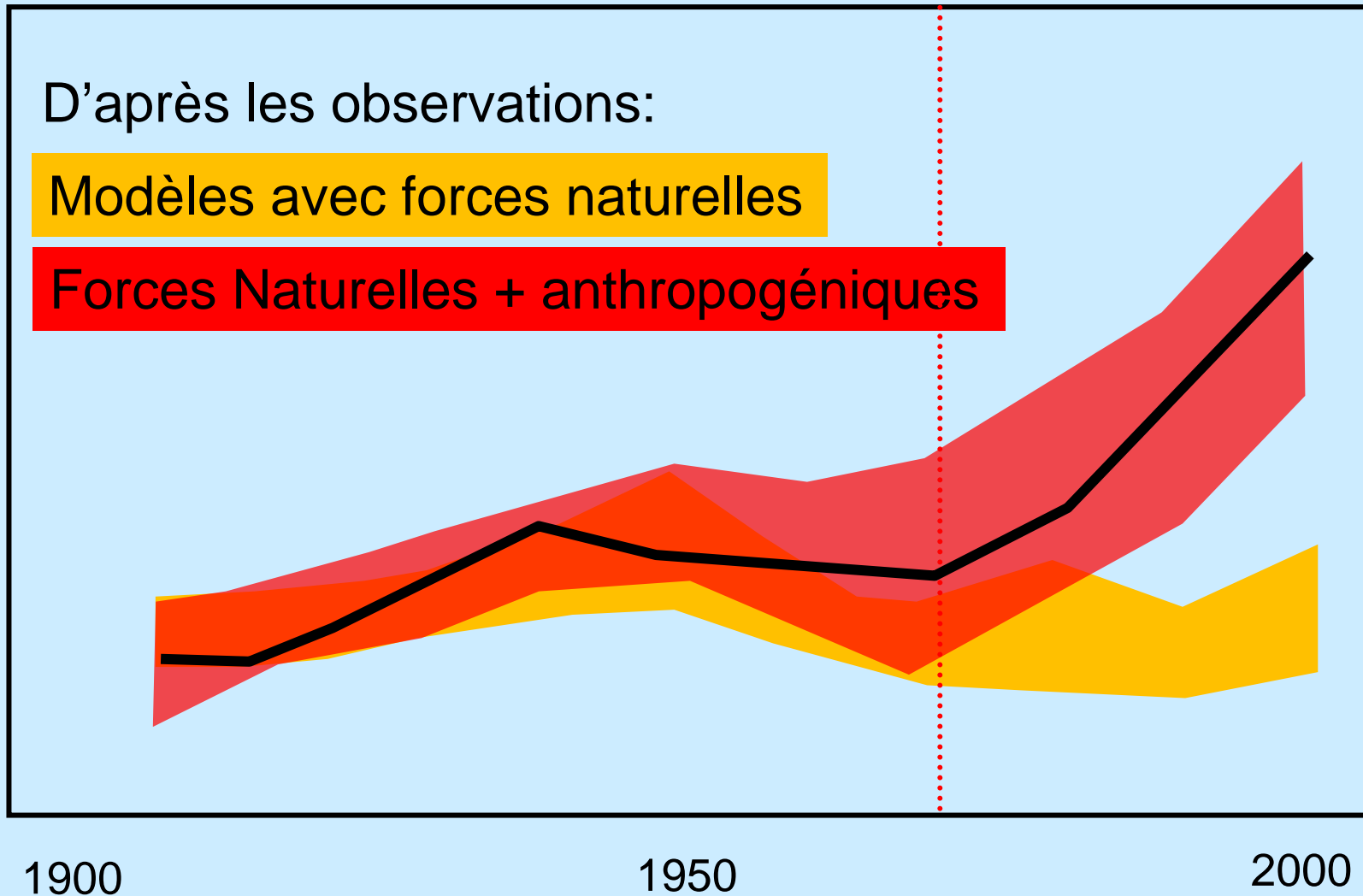
Atmosphère



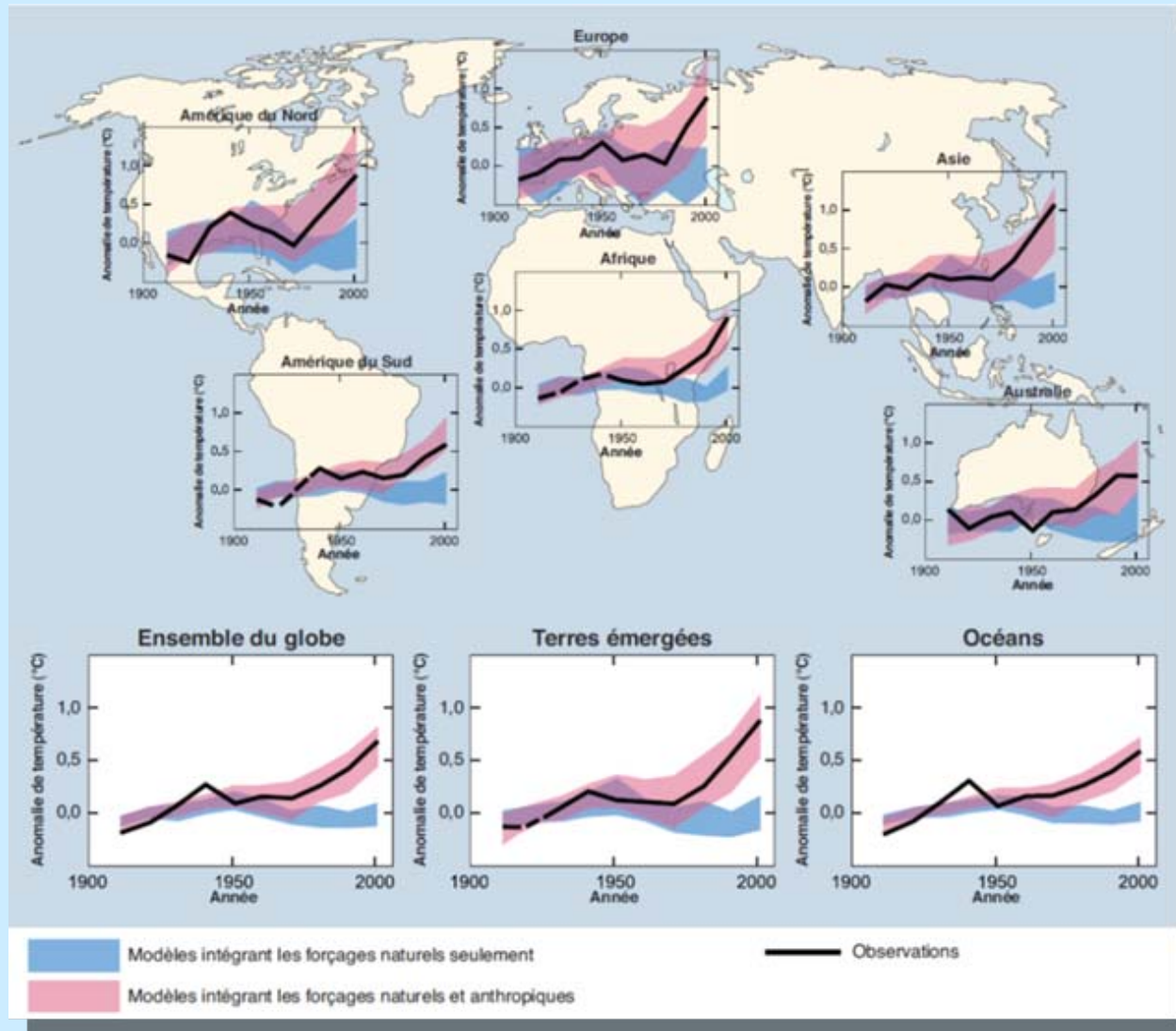
CO_2 , CH_4 , H_2O
 CFC , N_2O , ...

Les activités humaines sont-elles responsables des changements observés?

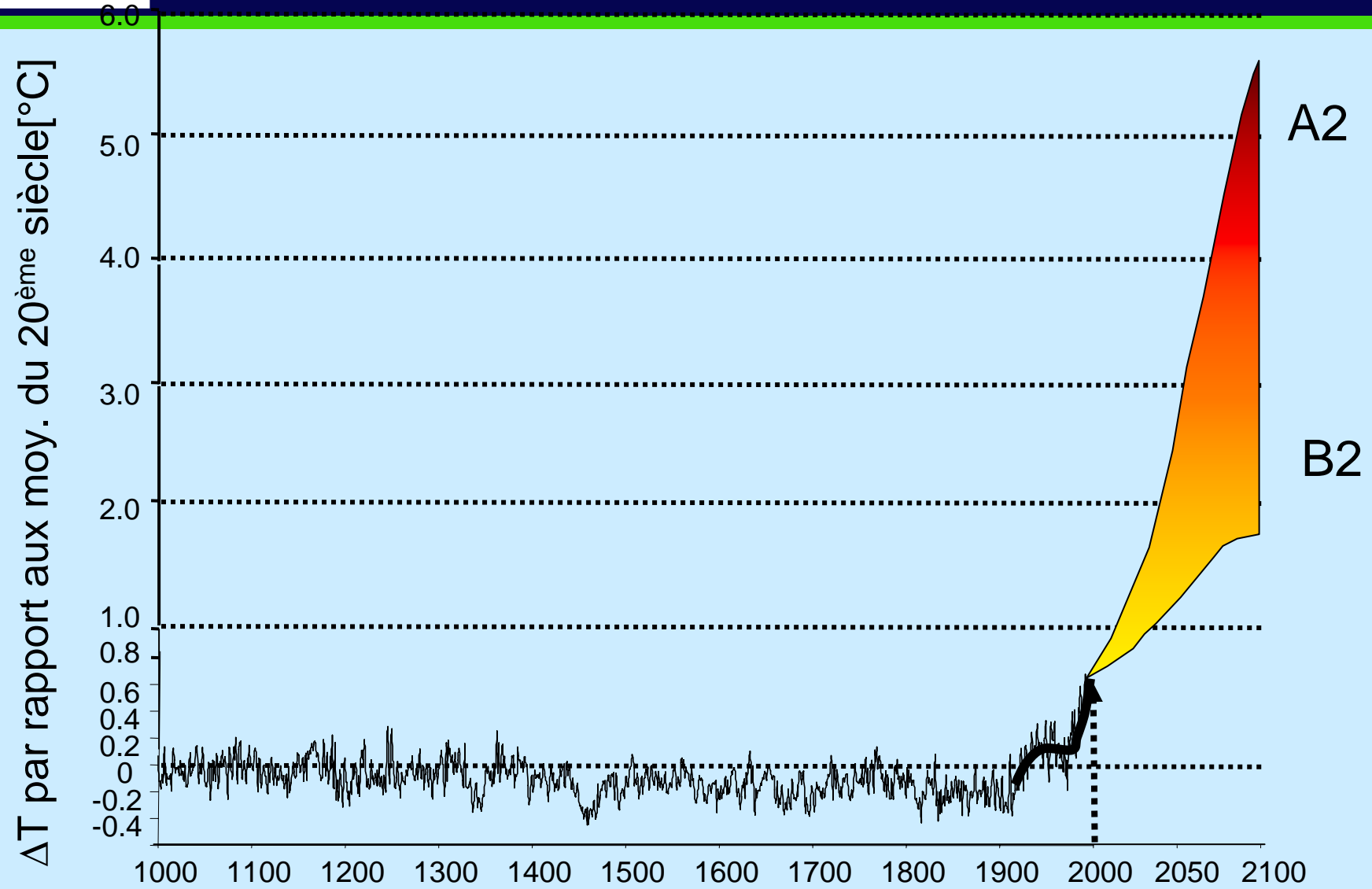
ΔT par rapport à 1961-1990 [$^{\circ}\text{C}$]



Les activités humaines sont-elles responsables des changements observés?

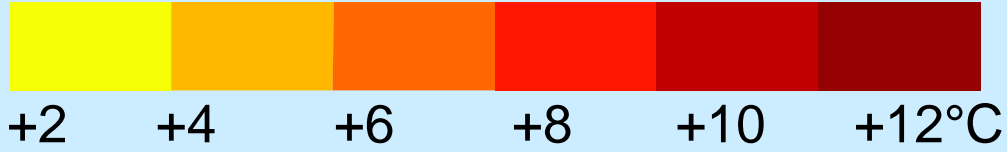
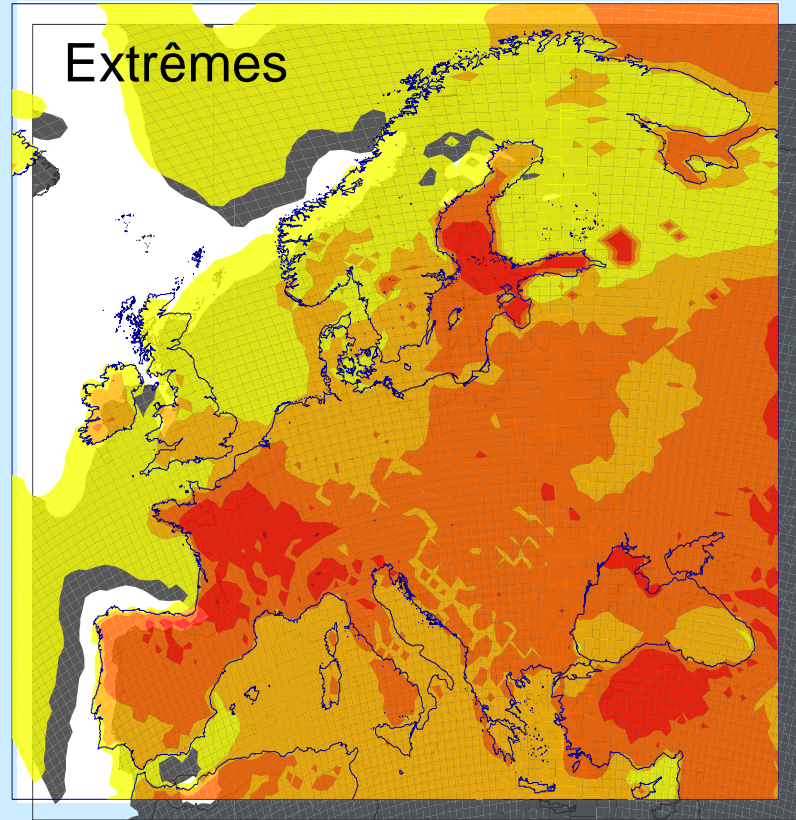
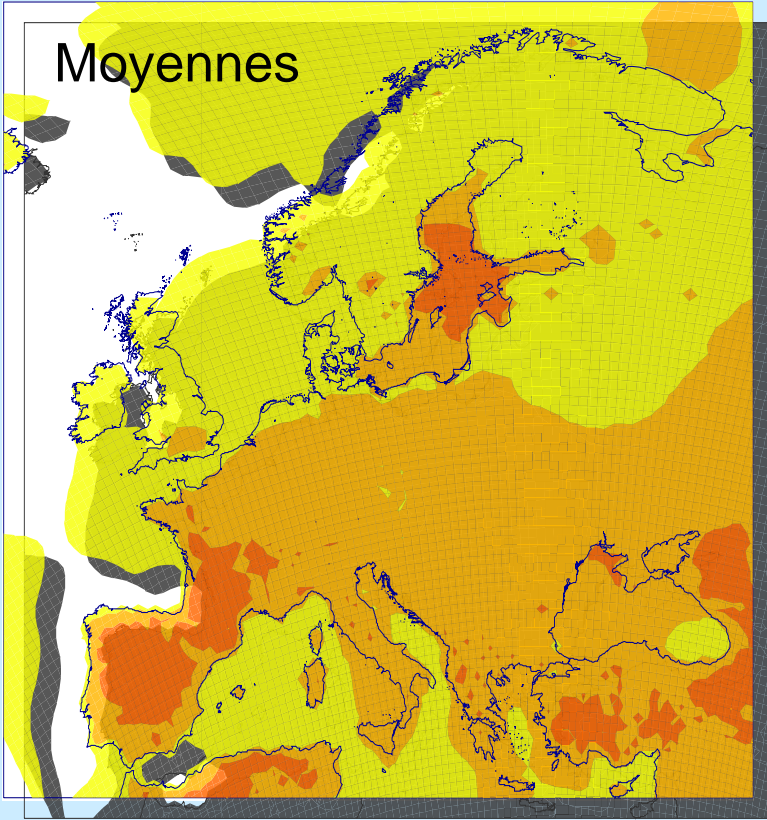


Réchauffement global prédit pour le futur...



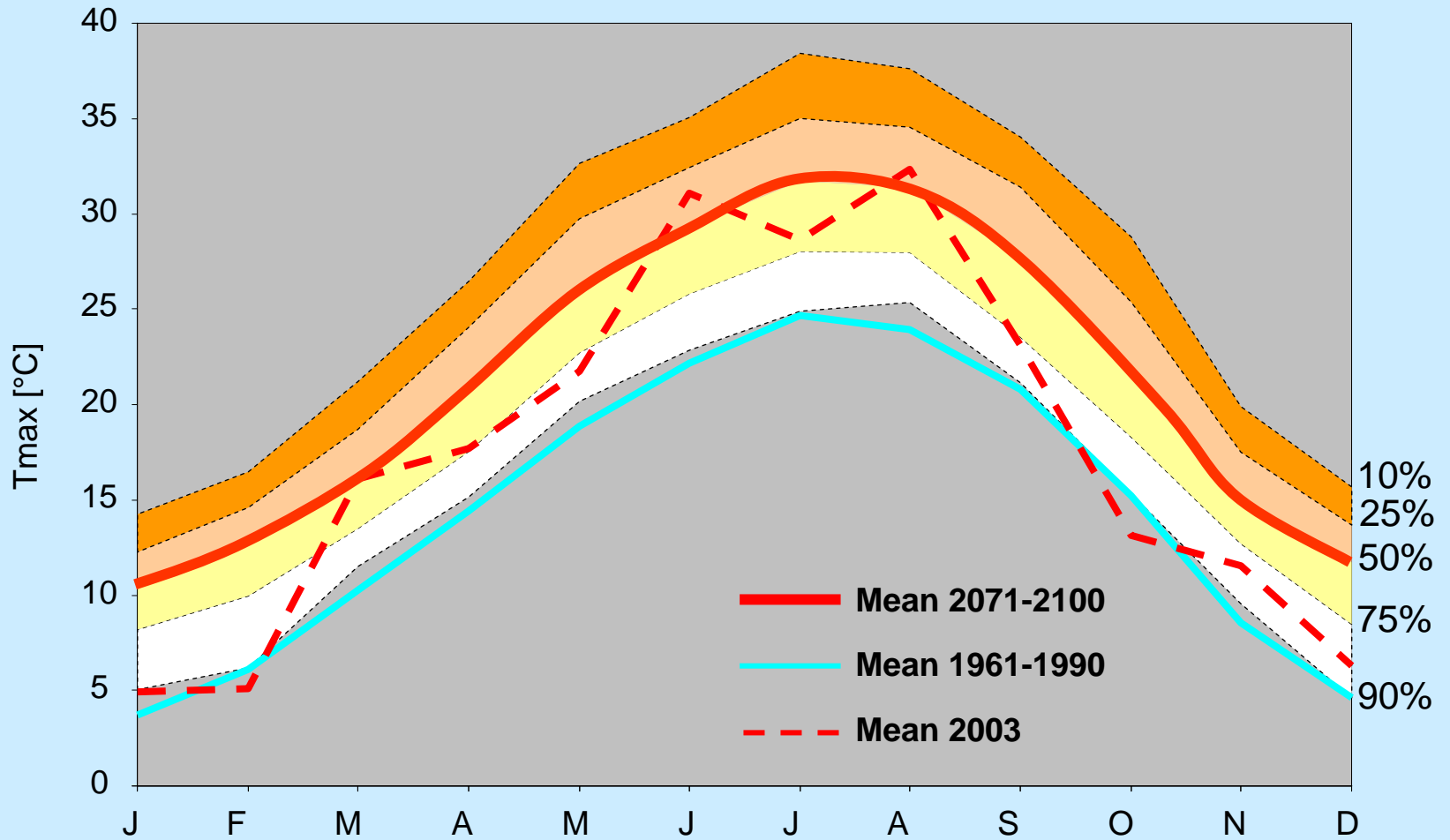
Températures (juin-juillet-août)

(Différences entre 2071-2100 et 1961-1990)
(Modèle Climatique Régional HIRHAM, A2 Scénario)



Beniston, 2004: Geophysical Research Letters

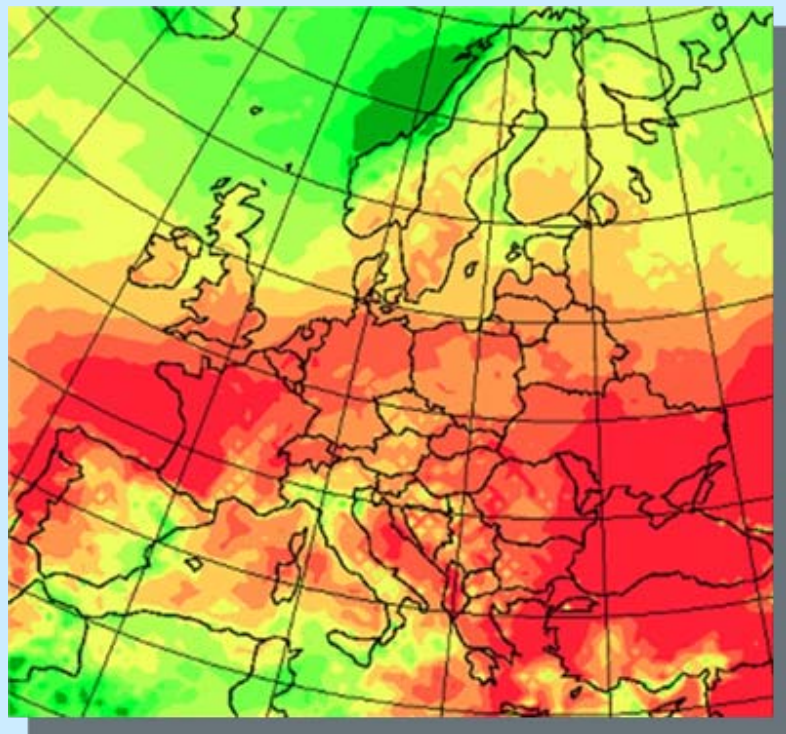
Températures maximales à Genève: Scénario A2, contrôle, et année 2003



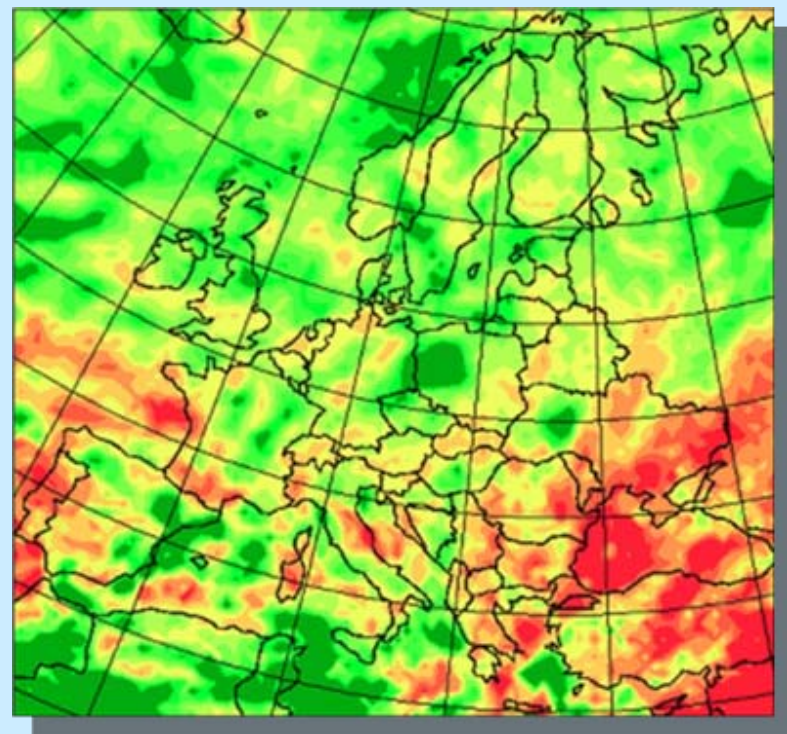
Précipitations (juin-juillet-août)

(Différences entre 2071-2100 et 1961-1990)
(Modèle Climatique Régional HIRHAM, A2 Scénario)

Précipitations saisonnières

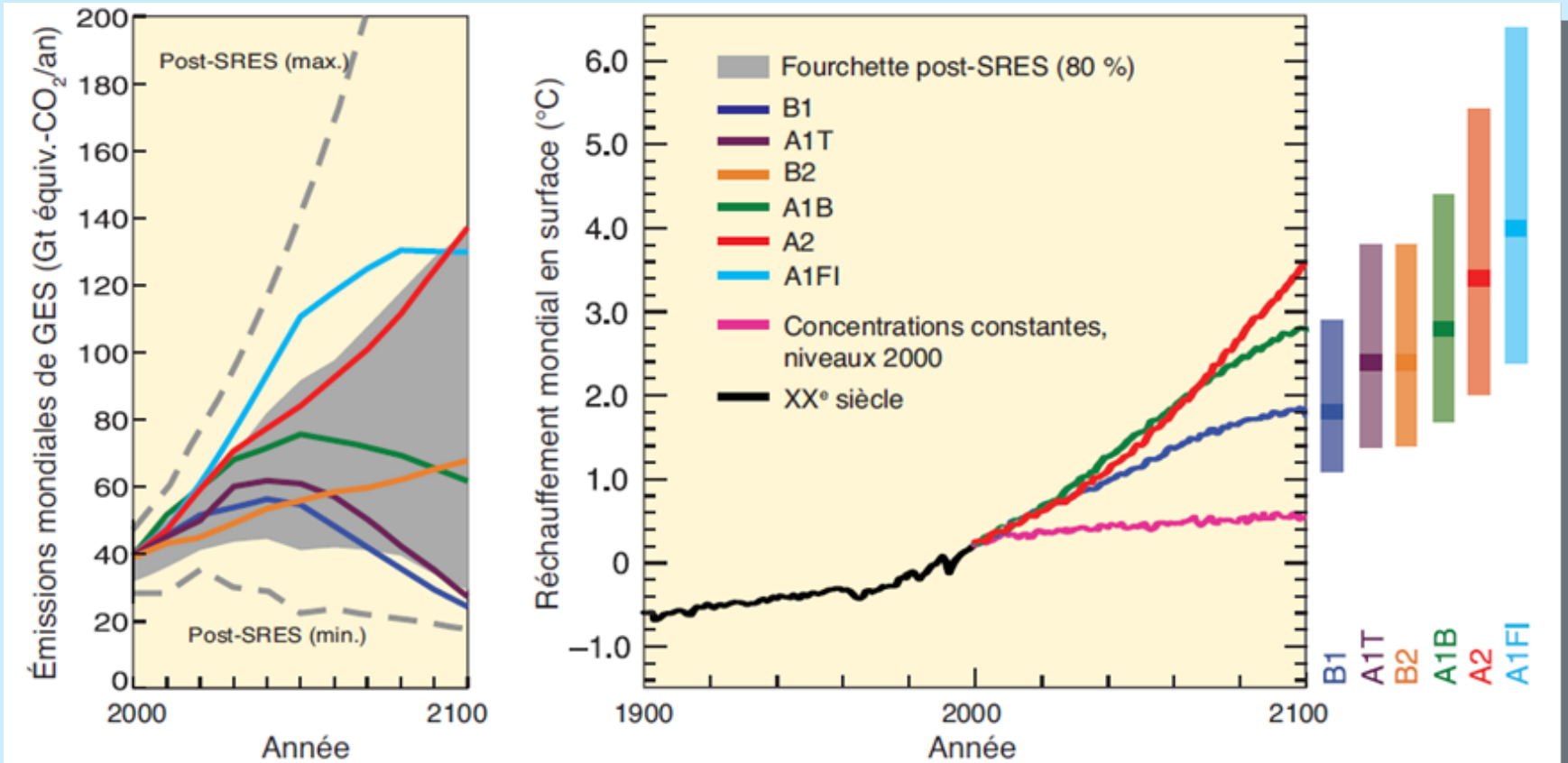


Evènements plus grand que 50 mm/jour



Christensen and Christensen, Nature, 2003

2. Scénarios: Quelle société pour les générations futures?



2. Scénarios pour le futur: Synthèse



3. Impacts sur l'eau: l'exemple du Lac Balaton en Hongrie

LAC BALATON

BALAHOT

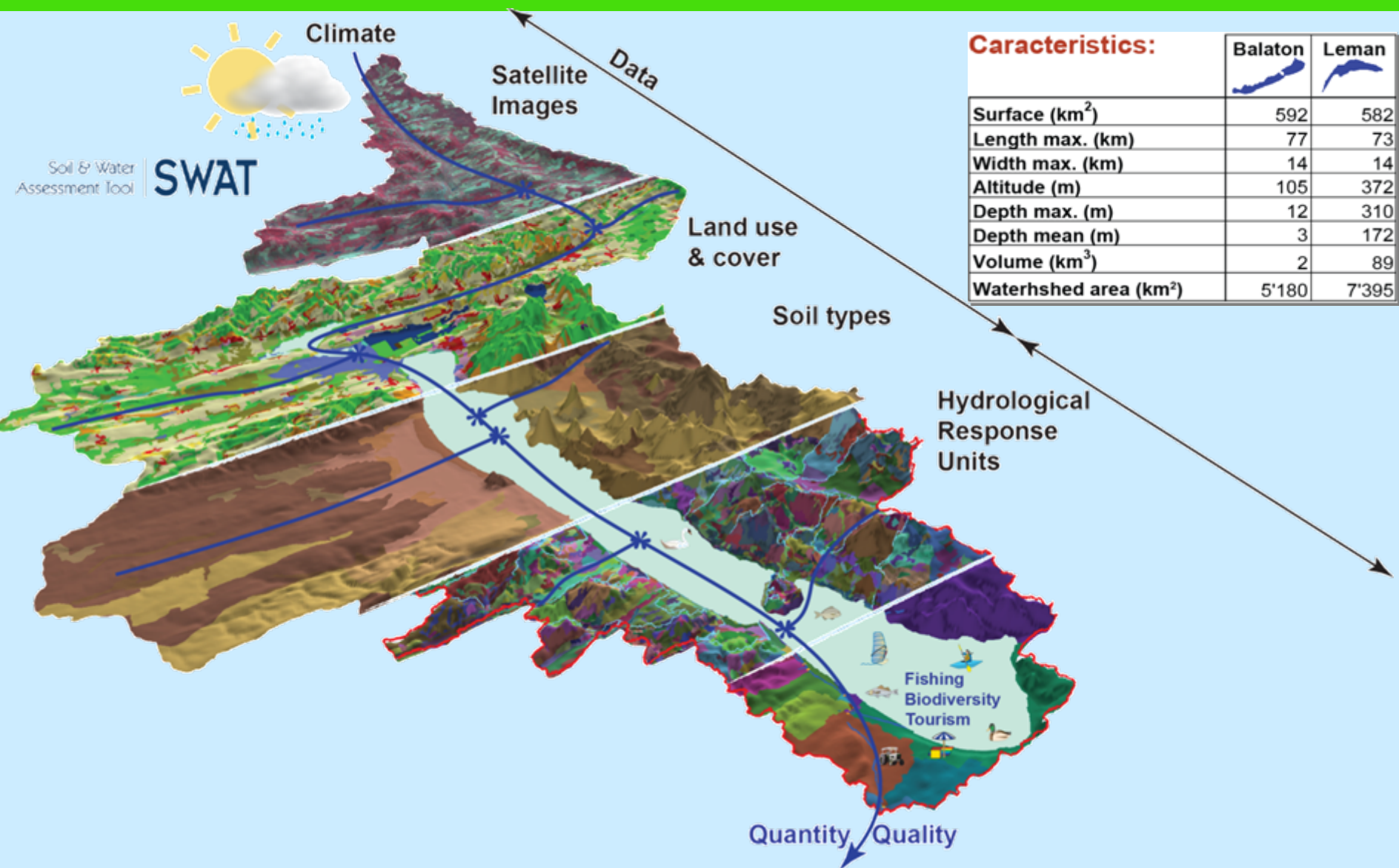
BALAPOL

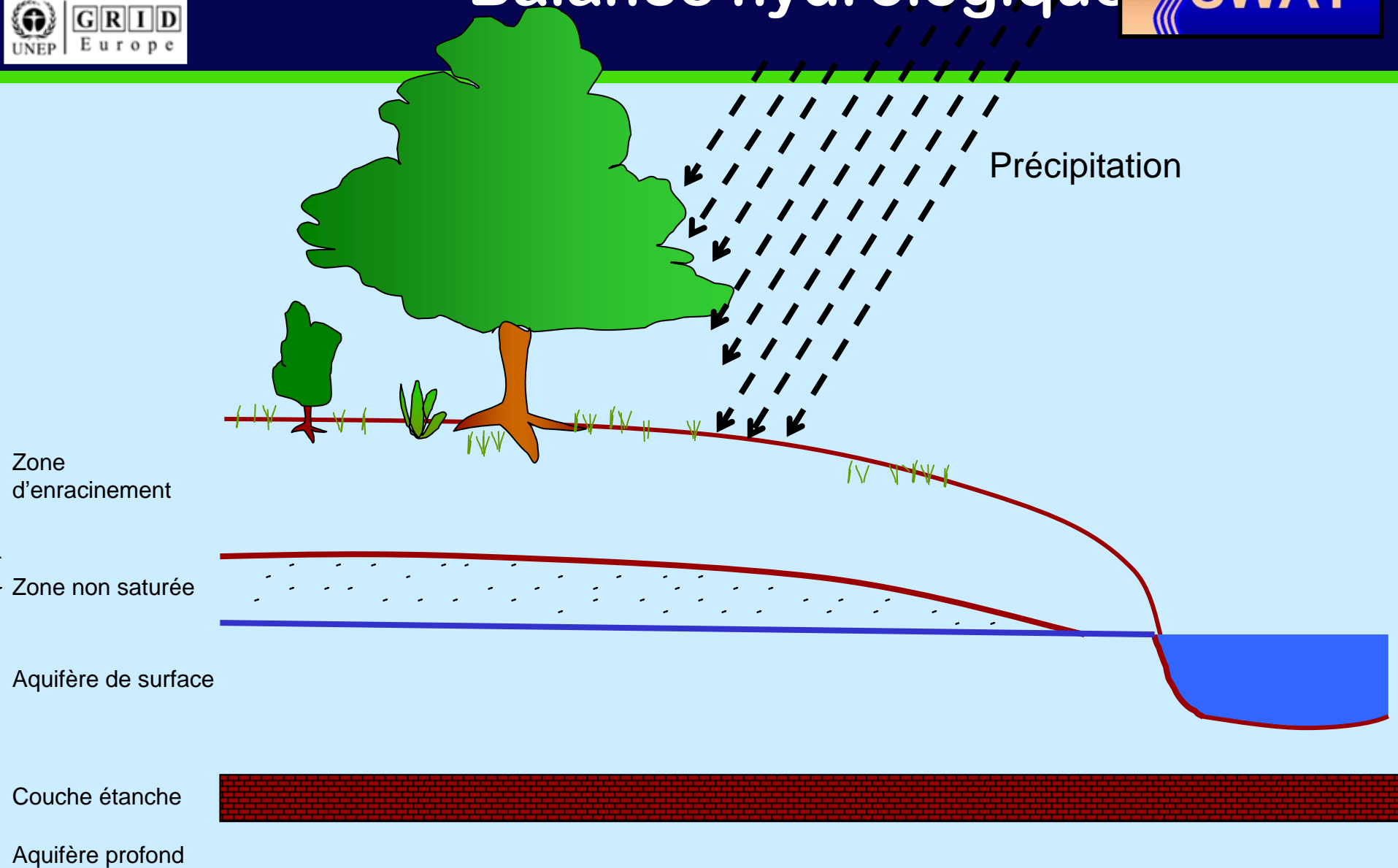


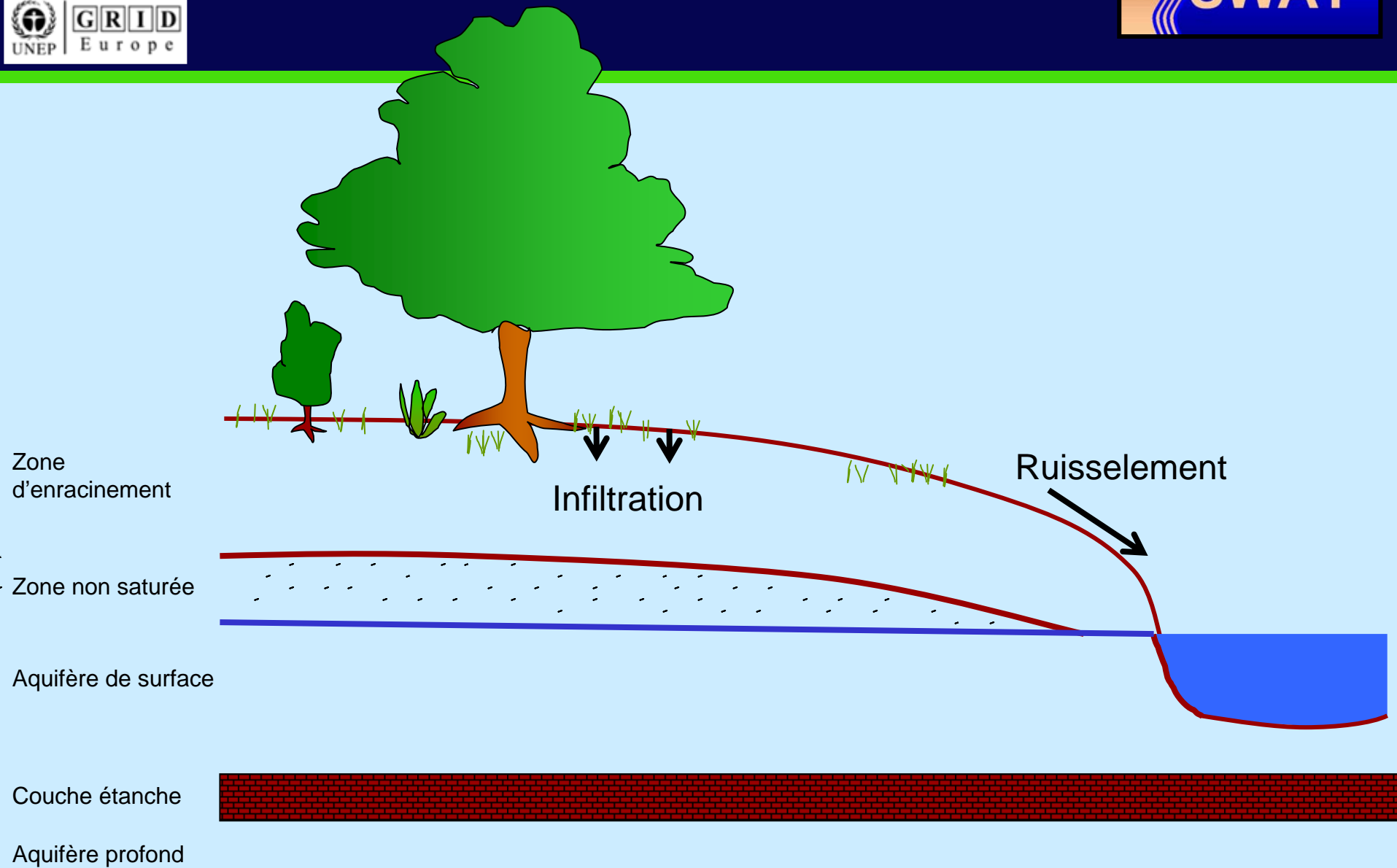
BALALONE

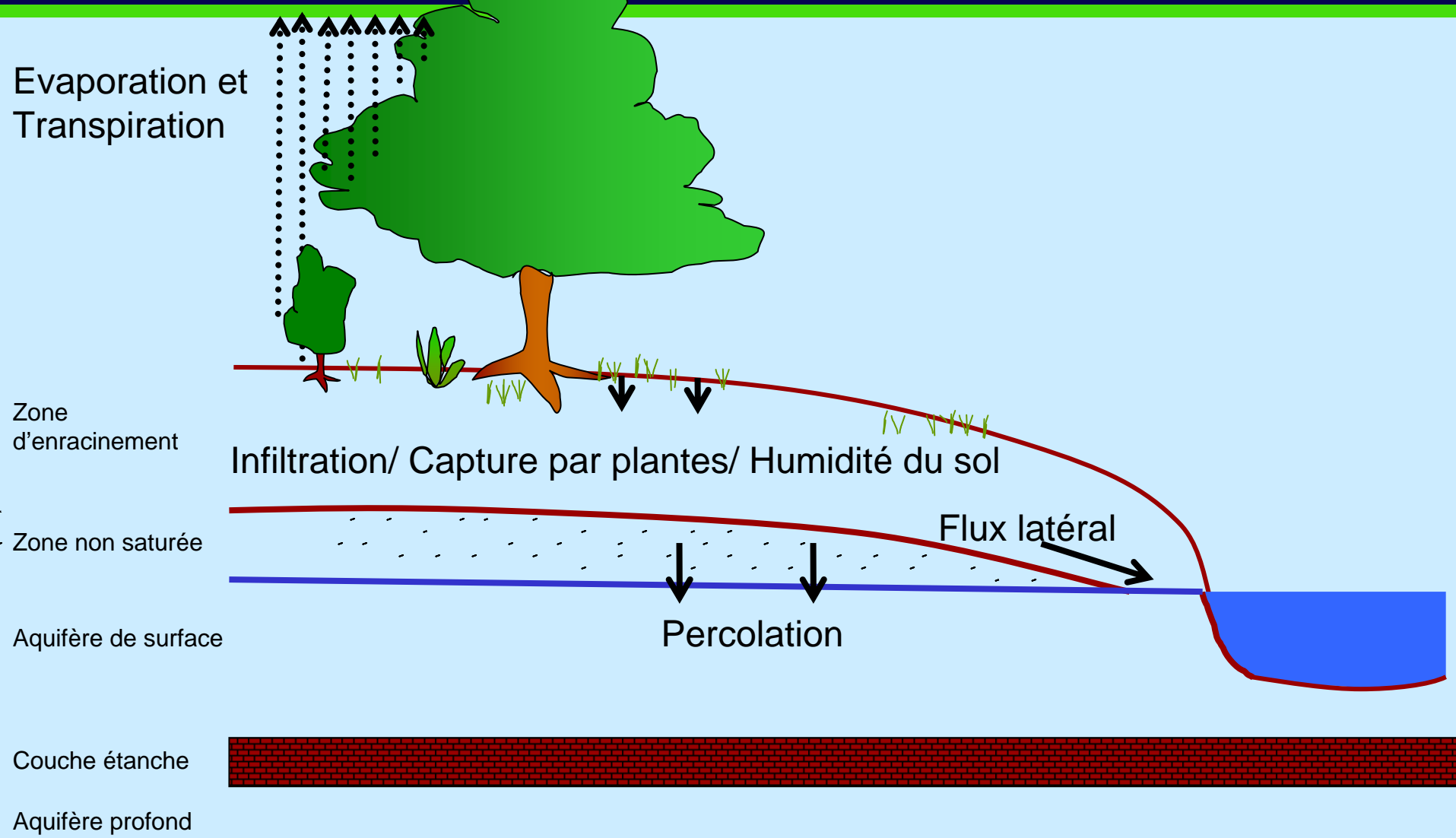
BALACOOOL

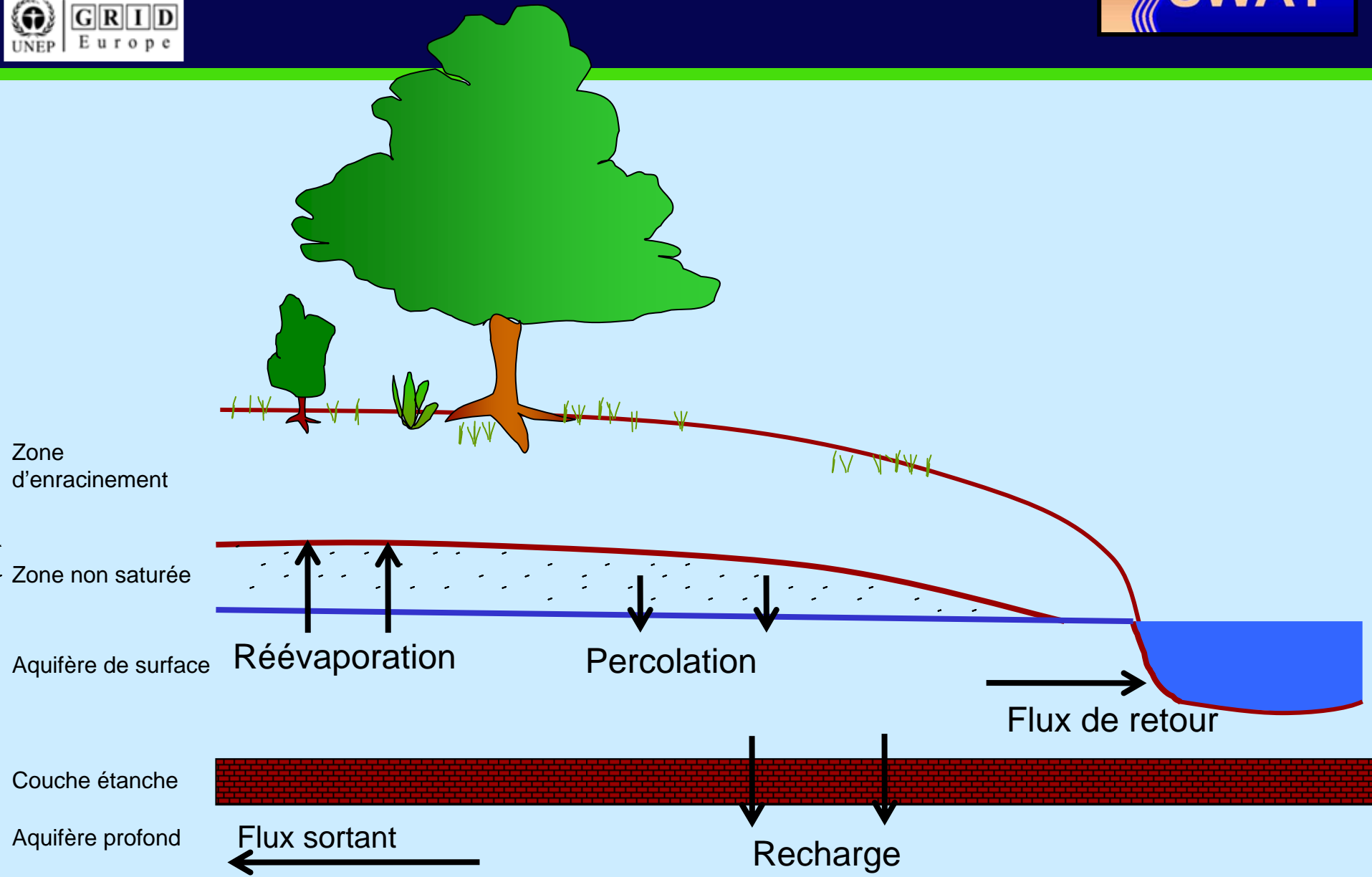
Données nécessaires pour modéliser l'hydrologie du bassin du Lac Balaton







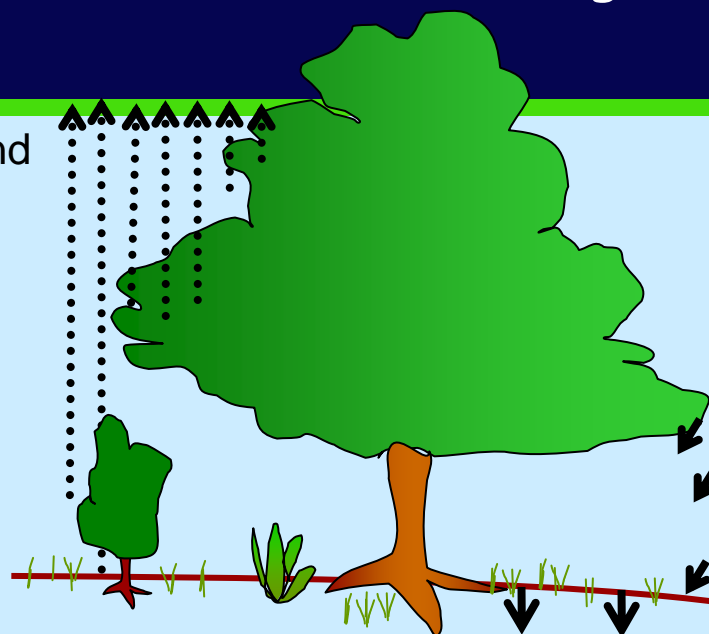




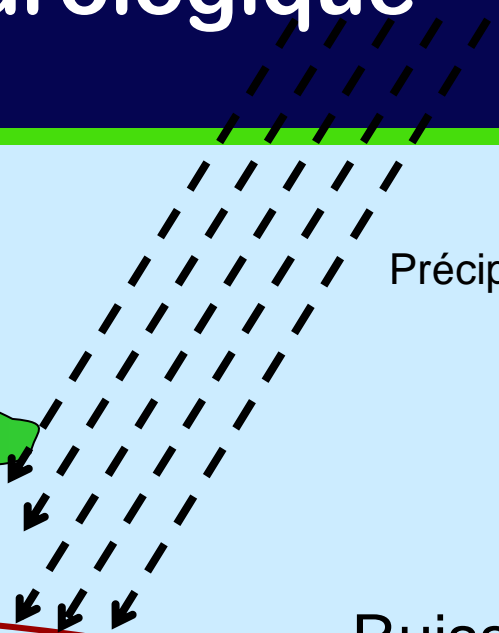
Balance Hydrologique



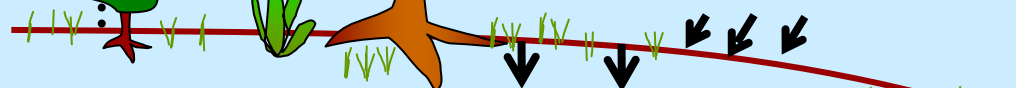
Evaporation and Transpiration



Précipitation



Zone d'enracinement

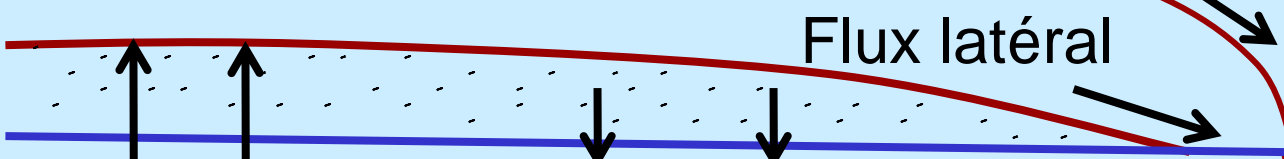


Infiltration/ Capture par plantes/ Humidité du sol

Ruissellement

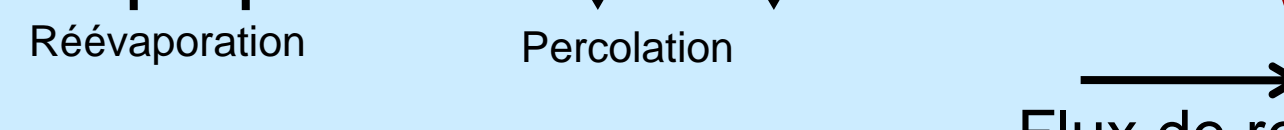


Zone non saturée



Flux latéral

Aquifère de surface



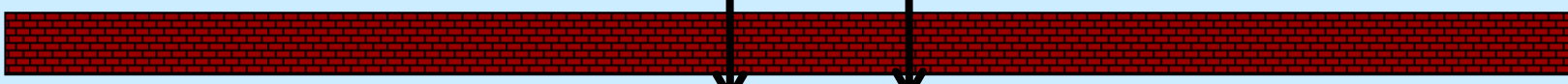
Réévaporation

Percolation

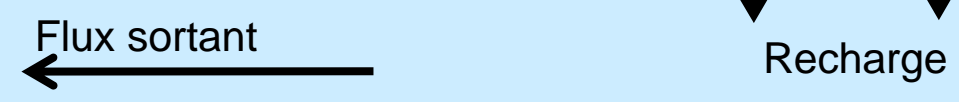
Flux de retour



Couche étanche

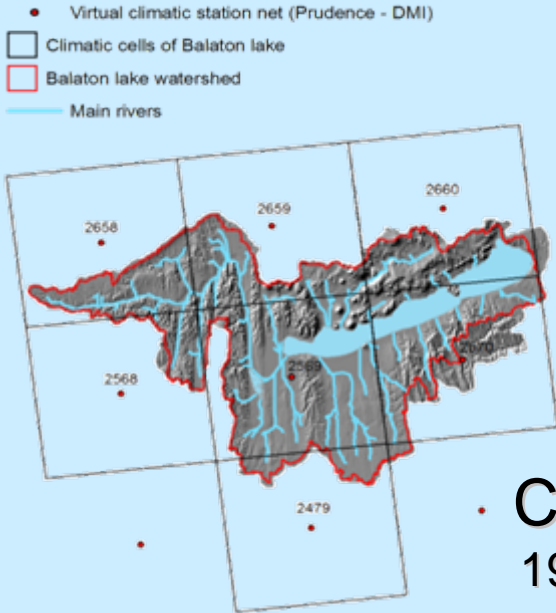


Aquifère profond



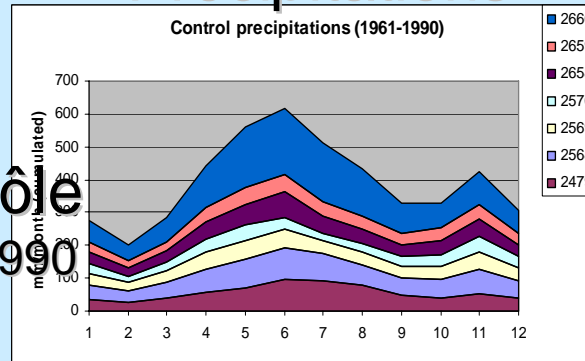
Flux sortant

Recharge

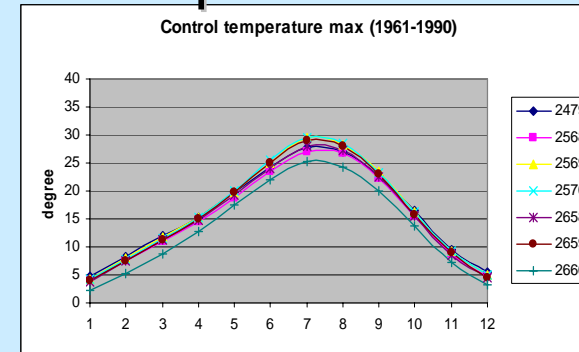


Contrôle
1961-1990

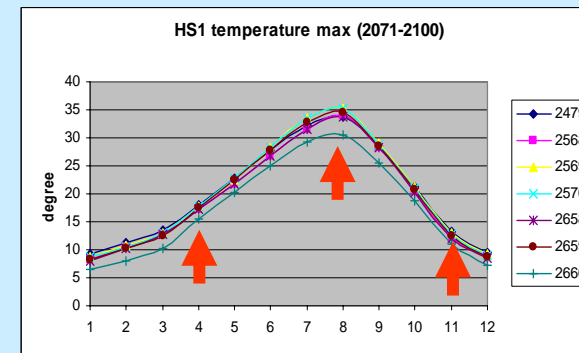
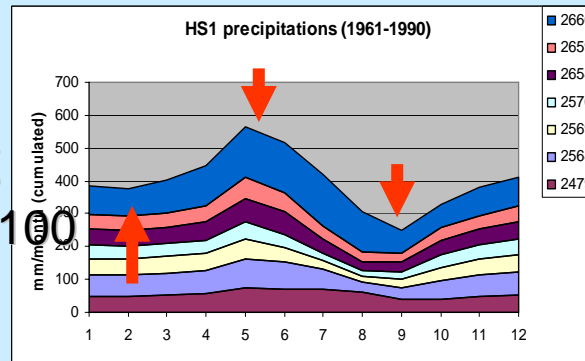
Précipitations



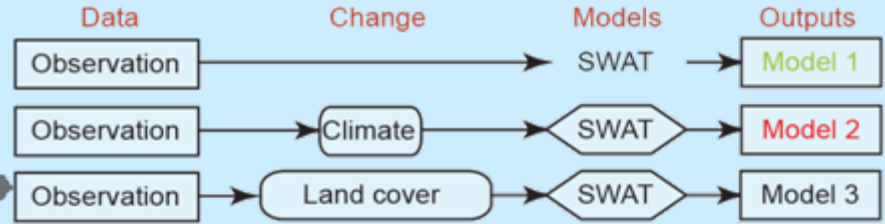
Température max

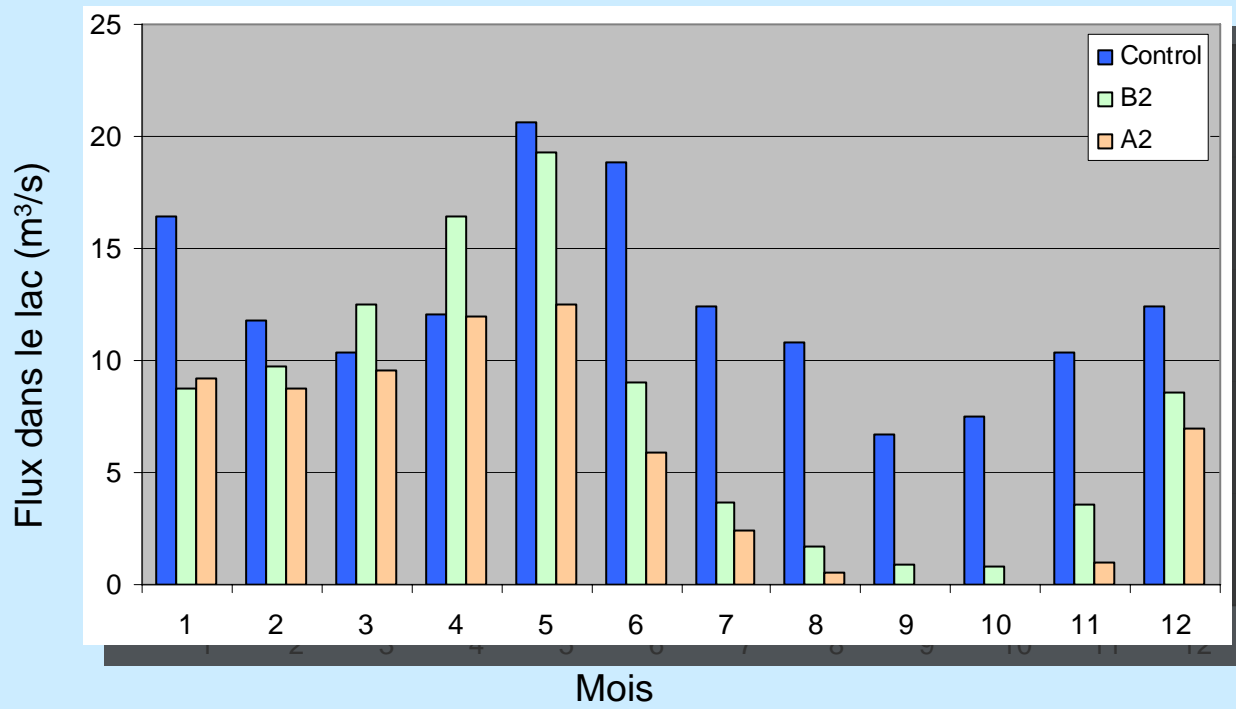


A2
2071-2100

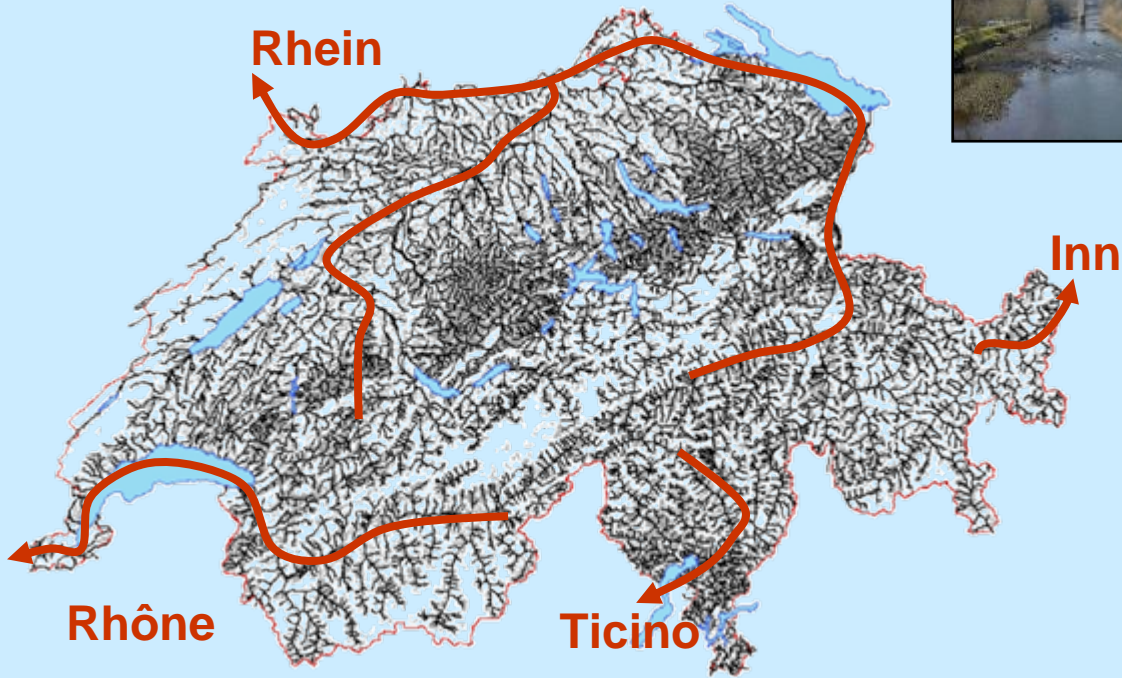
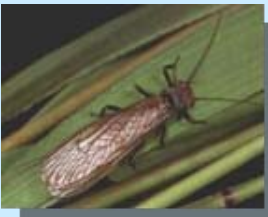


Moins de pluie en été et automne, températures plus élevées toute l'année !!! >> sécheresse?

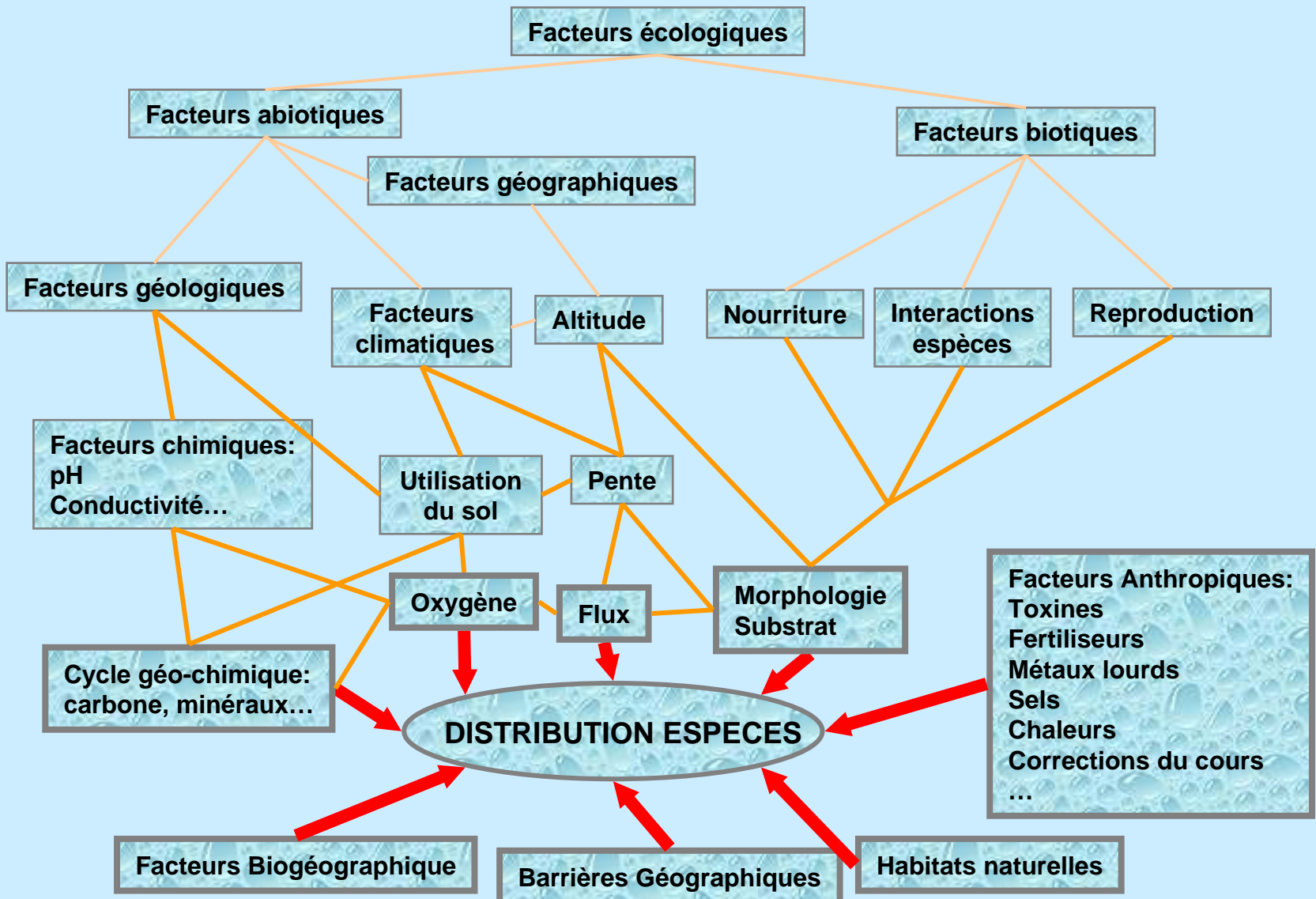




4. Impacts sur la faune aquatique: rivières de Suisse

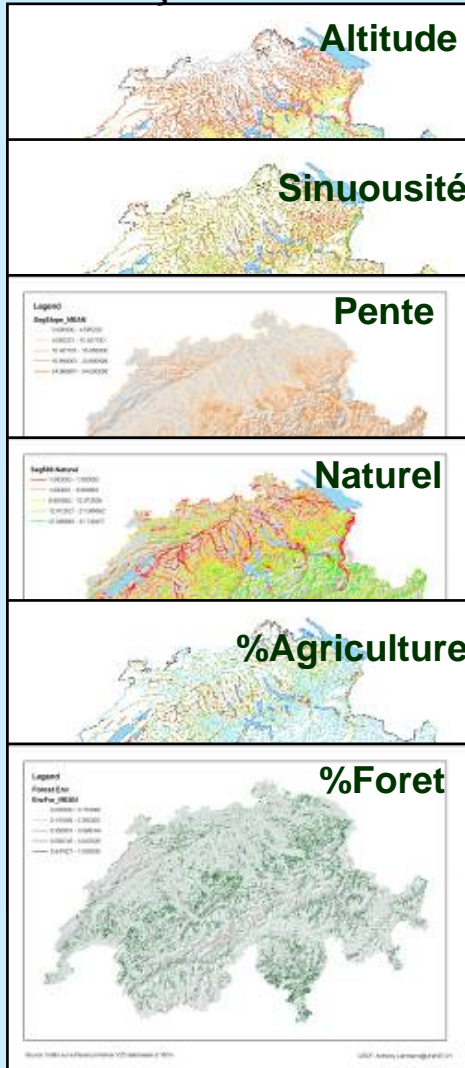


Facteurs de distribution de la faune aquatique

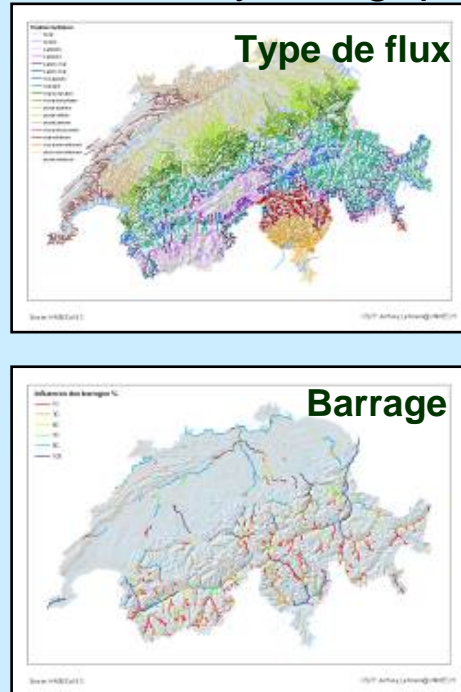


VARIABLES CARTOGRAPHIÉES

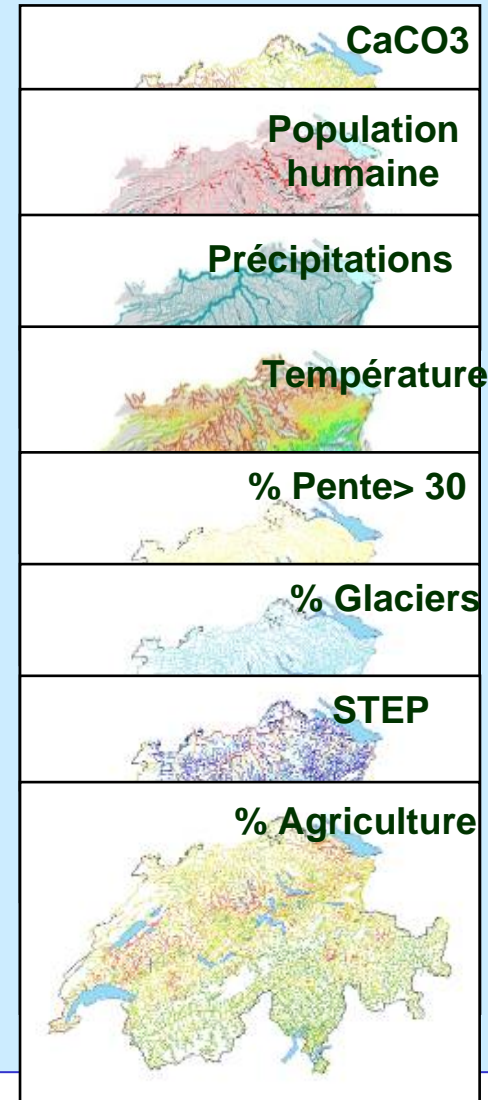
Tronçons de 500m

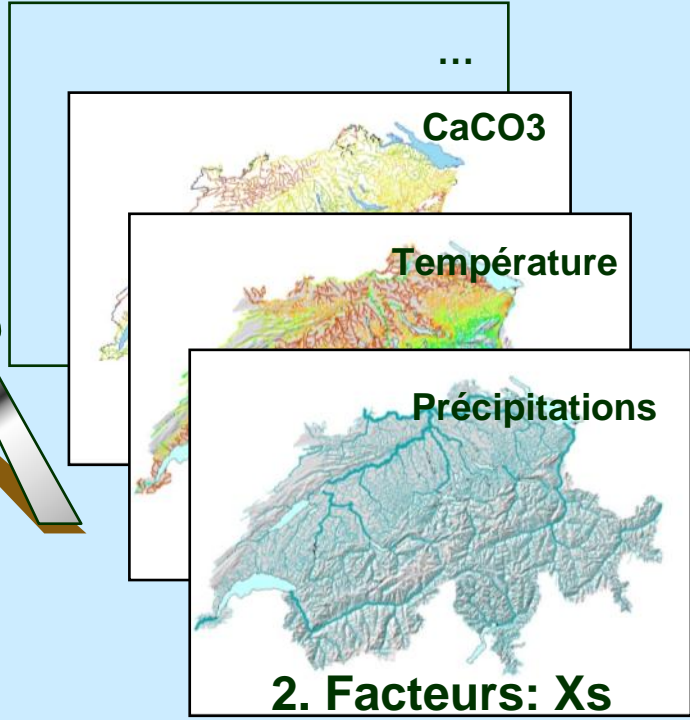
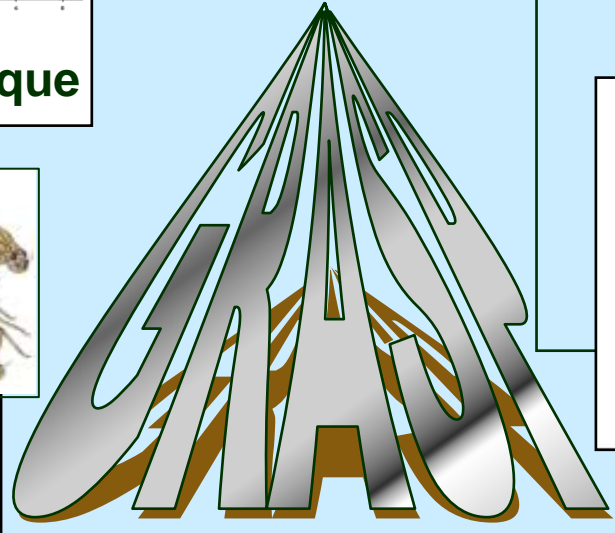
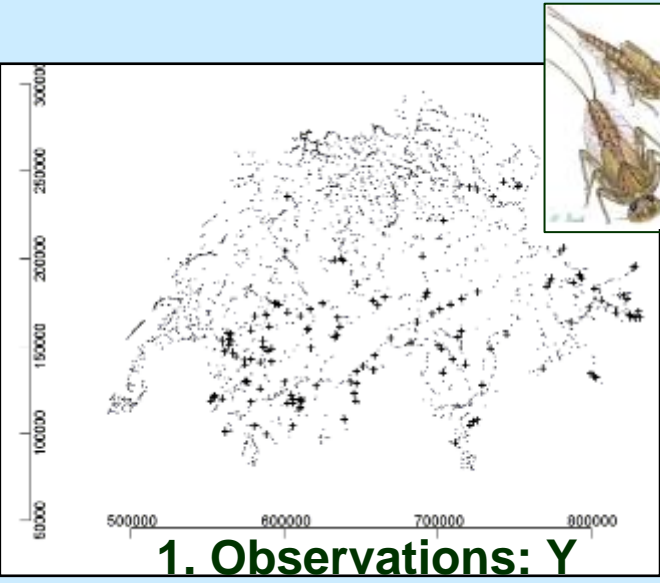
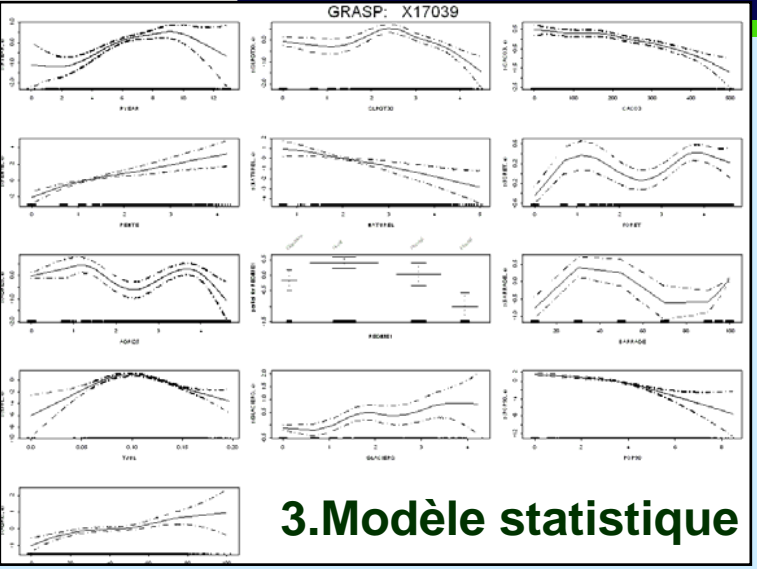
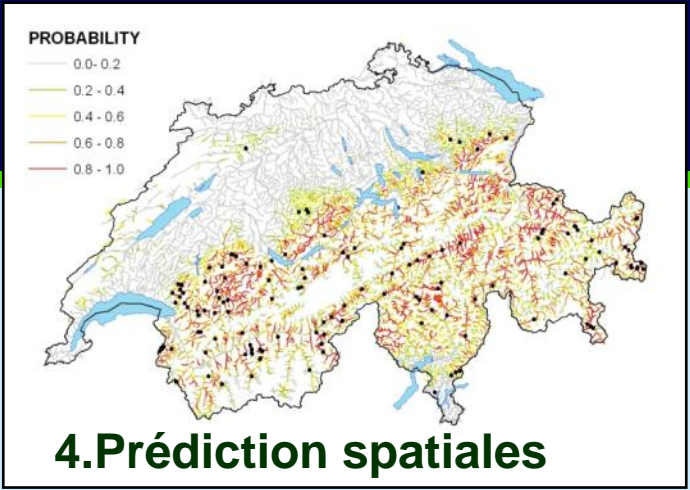


Atlas hydrologique

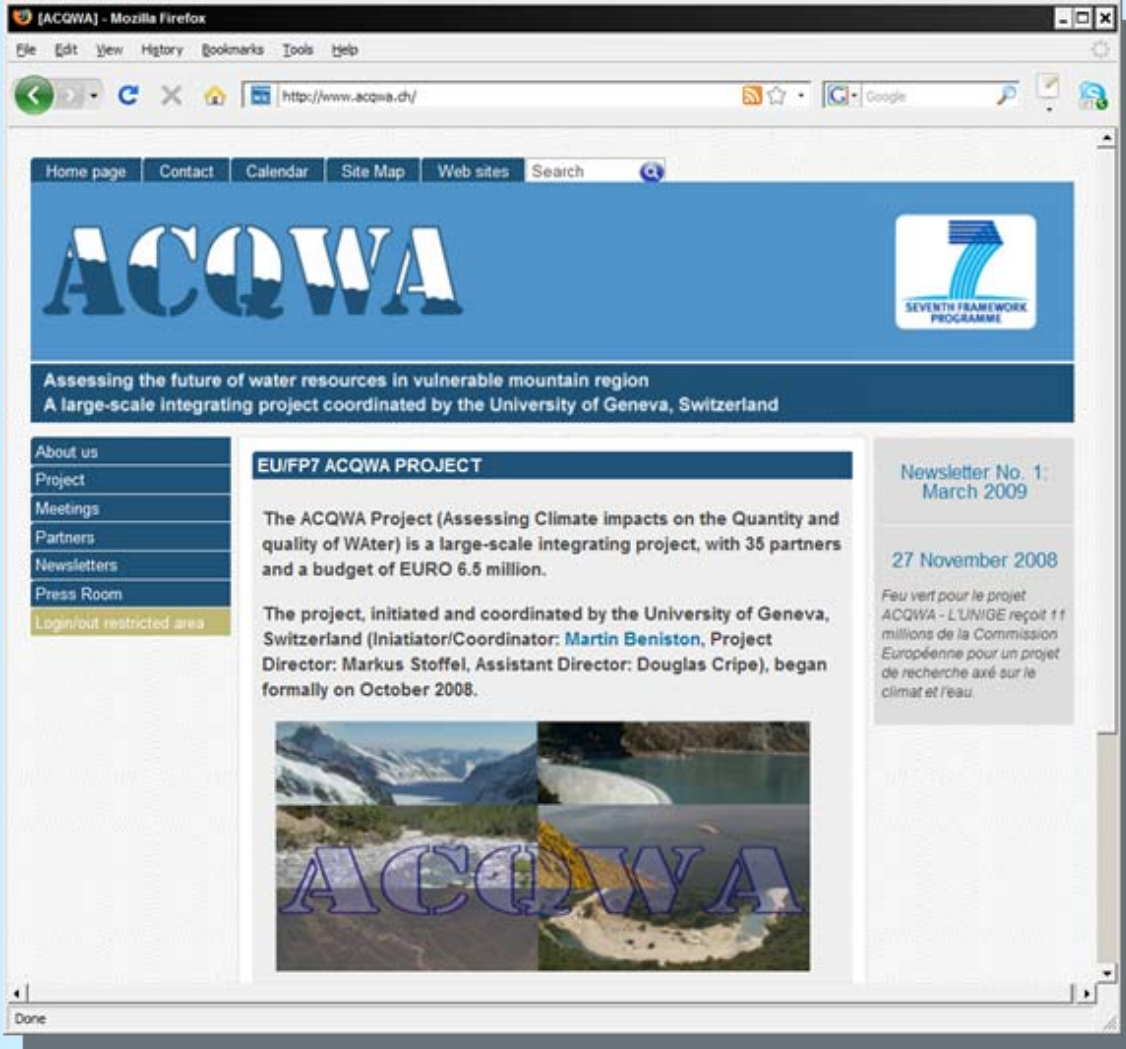


Bassins versants (1000m)





5. Impacts sur les régions de montagne: le projet européen ACQWA



The screenshot shows the ACQWA website in a Mozilla Firefox browser window. The browser's address bar displays the URL <http://www.acqwa.ch/>. The website features a navigation menu with links for Home page, Contact, Calendar, Site Map, Web sites, and a search bar. The main header includes the ACQWA logo and the Seventh Framework Programme logo. Below the header, a blue banner reads: "Assessing the future of water resources in vulnerable mountain region. A large-scale integrating project coordinated by the University of Geneva, Switzerland".

On the left side, there is a vertical menu with the following items: About us, Project, Meetings, Partners, Newsletters, Press Room, and Login/out restricted area.

The main content area is titled "EU/FP7 ACQWA PROJECT" and contains the following text:

The ACQWA Project (Assessing Climate impacts on the Quantity and quality of Water) is a large-scale integrating project, with 35 partners and a budget of EURO 6.5 million.

The project, initiated and coordinated by the University of Geneva, Switzerland (Initiator/Coordinator: [Martin Beniston](#), Project Director: [Markus Stoffel](#), Assistant Director: [Douglas Cripe](#)), began formally on October 2008.

Below the text is a collage of four images showing mountain landscapes and water bodies, with the ACQWA logo overlaid in a large, semi-transparent font.

On the right side, there is a section for "Newsletter No. 1: March 2009" dated "27 November 2008". The text in this section reads: "Feu vert pour le projet ACQWA - L'UNIGE reçoit 11 millions de la Commission Européenne pour un projet de recherche axé sur le climat et l'eau."

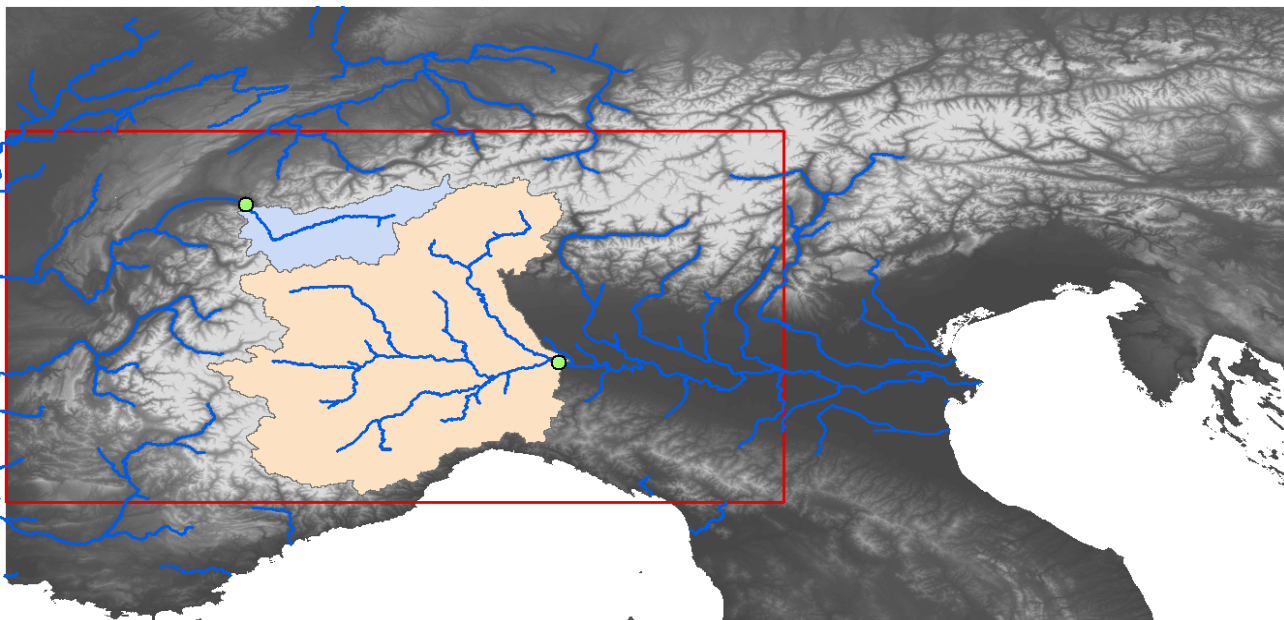
acqwaSDI - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://metafunctions.grid.unep.ch/acqwa/index.php?topic=viewer

acqwaCatalogue acqwaViewer acqwaServices acqwaRegistry Help About

ACQWA



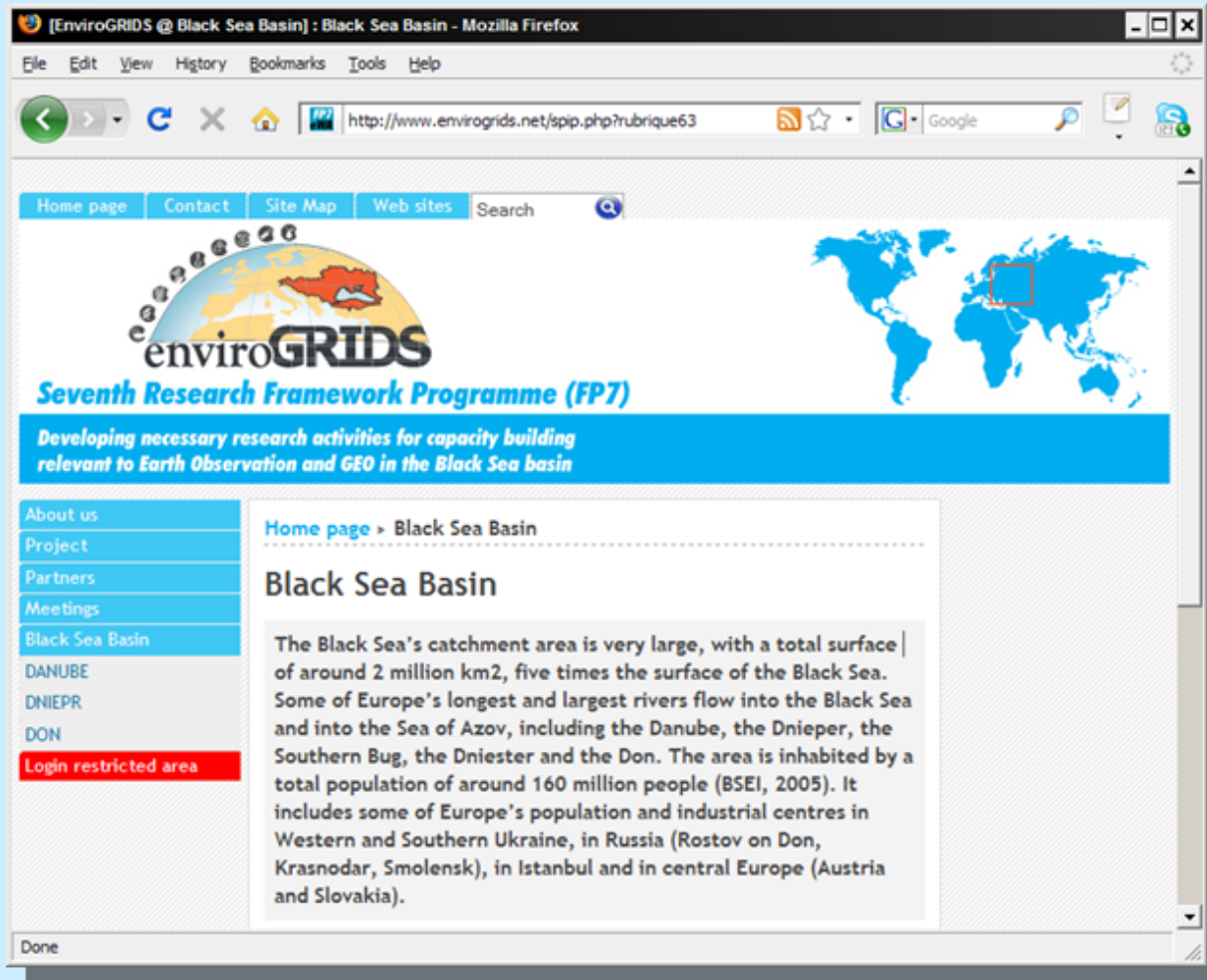
Base layers

- Boundaries
- GEBCO

19000 km

Transferring data from metafunctions.grid.unep.ch...

6. Impacts sur le bassin de la Mer Noire: le projet européen enviroGRIDS



[EnviroGRIDS @ Black Sea Basin] : Black Sea Basin - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.envirogrids.net/spip.php?rubrique63

Home page Contact Site Map Web sites Search

enviroGRIDS
Seventh Research Framework Programme (FP7)
Developing necessary research activities for capacity building relevant to Earth Observation and GEO in the Black Sea basin

About us
Project
Partners
Meetings
Black Sea Basin
DANUBE
DNIIEPR
DON
Login restricted area

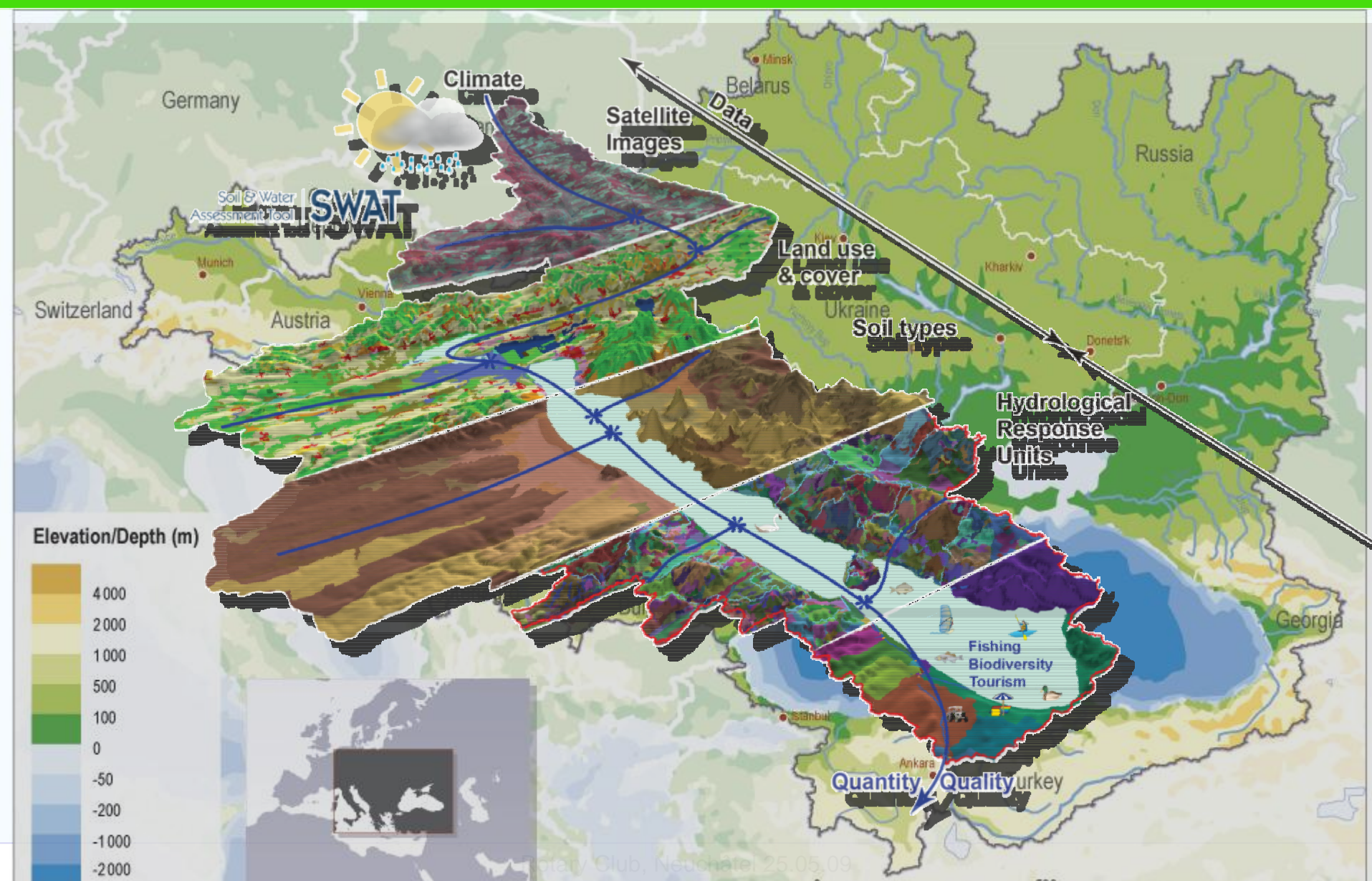
Home page > Black Sea Basin

Black Sea Basin

The Black Sea's catchment area is very large, with a total surface of around 2 million km², five times the surface of the Black Sea. Some of Europe's longest and largest rivers flow into the Black Sea and into the Sea of Azov, including the Danube, the Dnieper, the Southern Bug, the Dniester and the Don. The area is inhabited by a total population of around 160 million people (BSEI, 2005). It includes some of Europe's population and industrial centres in Western and Southern Ukraine, in Russia (Rostov on Don, Krasnodar, Smolensk), in Istanbul and in central Europe (Austria and Slovakia).

Done

Modélisation hydrologique du bassin de la Mer Noire



Partenaires du projets enviroGRIDS



GEOSS

« Group on Earth Observation System of Systems »



Windows Internet Explorer

GROUP ON EARTH OBSERVATIONS | GEO Portal

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DISASTERS HEALTH ENERGY CLIMATE WATER WEATHER ECOSYSTEMS AGRICULTURE BIODIVERSITY

BREAKING NEWS
FLOODS IN IOWA, USA
 Further to the flooding which occurred on 10 June, 10,000 people were forced to evacuate. The water is now moving towards Iowa City and Des Moines.

WELCOME TO GEOPORTAL
 The GEOportal provides an entry point to access remote sensing, geospatial static and in-situ data, information and services.

FOCUS ON
2nd GEOSS Asia-Pacific Symposium concludes in Tokyo

SHOWCASE
Climate change and Malaria
 There is increasing evidence that climate change has a significant role in causing malaria epidemics. With climate conditions changing in the future, due to increased concentrations of carbon dioxide in the atmosphere, conditions for pests also change. By 2050, the primary Malaria agent, the falciparum malaria parasite, will be able to spread into new areas.

7. Quelques conclusions

- Les changements climatiques vont grandement **modifier** la répartition, la qualité et la disponibilité des **ressources en eau** dans la plupart des régions du monde
- Ce problème est **largement ignoré** par la plupart des pays, et surtout ceux en développement
- Il est important de développer des **outils de pré-alerte** afin d'encourager les décideurs et les populations à imaginer des solutions pour s'adapter à ses changements
- Les nouvelles **technologies de l'information** sont capables d'aider à mieux faire passer ce message

Et comment convaincre les décideurs d'agir...





MERCI

