

Cambiamenti Climatici nel Mediterraneo, problema globale, soluzioni locali

INGV - Istituto Nazionale di Geofisica e Vulcanologia - Italy

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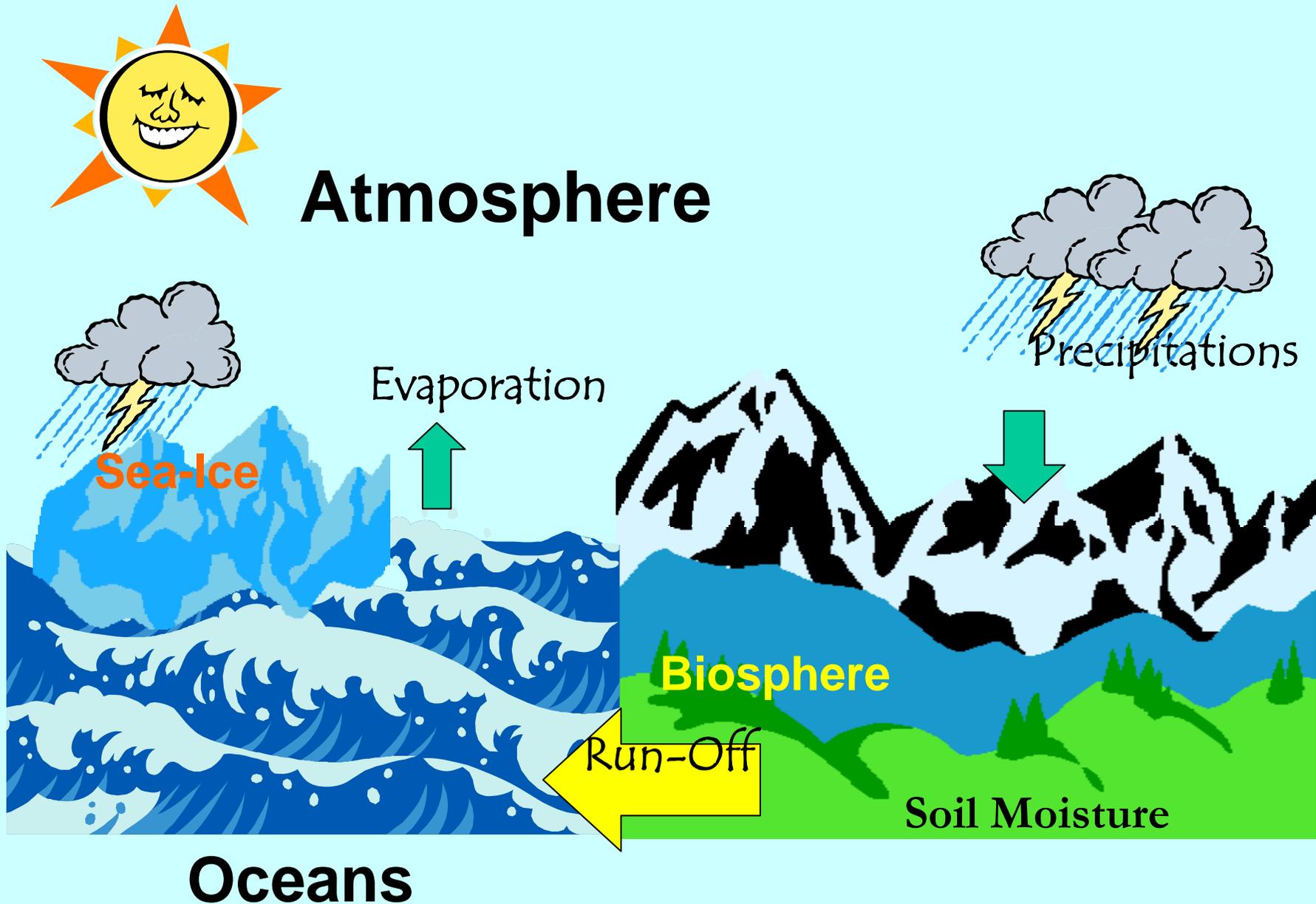
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Centro EuroMediterraneo

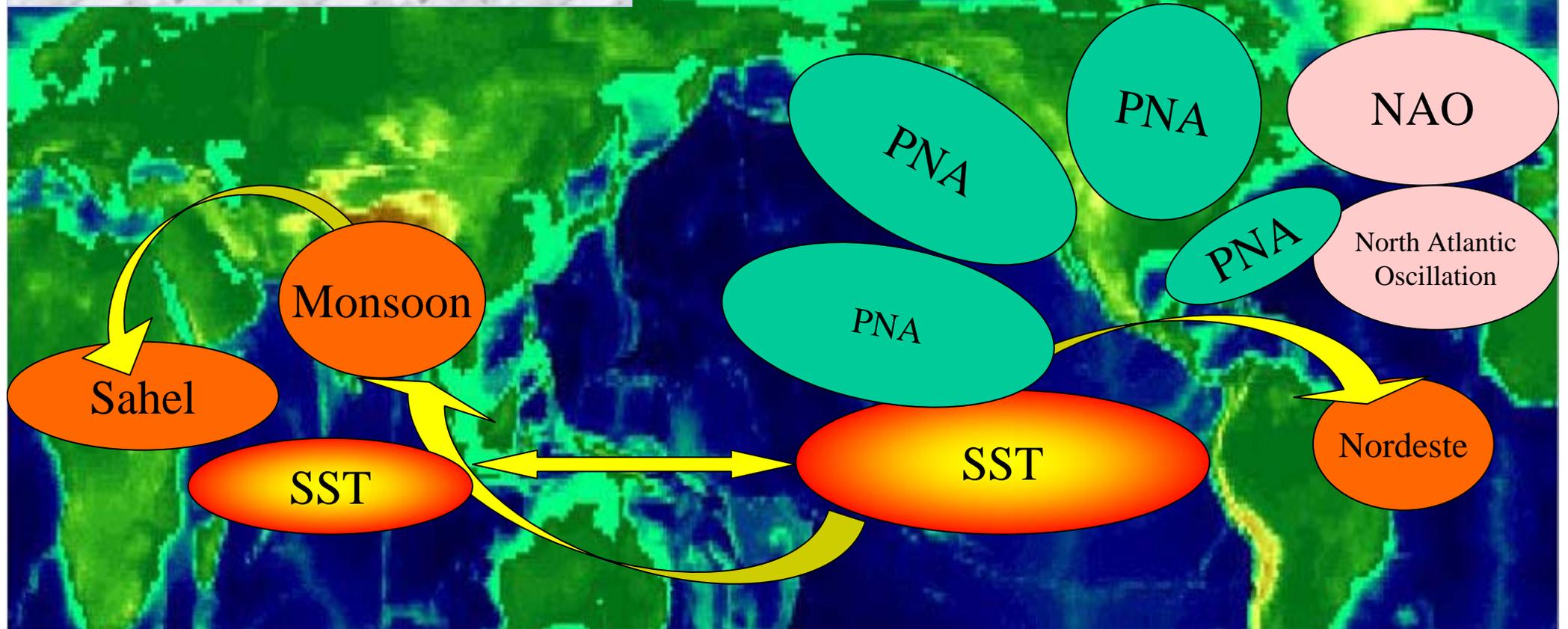
per i cambiamenti climatici



The Climate System



Teleconnections

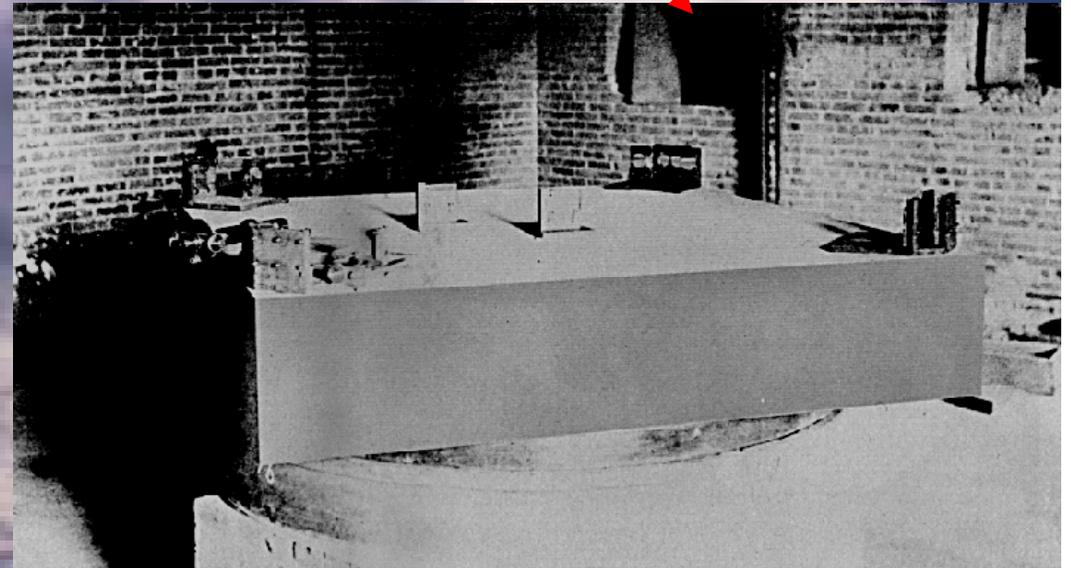


The interactions between atmosphere and oceans in the tropics dominate the variability at interannual scales. The main player is the variability in the equatorial Pacific. Wavetrains of anomaly stem from the region into the mid-latitudes, as the Pacific North American Pattern (PNA). The tropics are connected through the Pacific SST influence on the Indian Ocean SST and the monsoon, Sahel and Nordeste precipitation. It has been proposed that in certain years the circle is closed and a full chain of teleconnections goes all around the tropics. Also shown is the North Atlantic Oscillation a major mode of variability in the Euro-atlantic sector whose coupled nature is still under investigation.

A scientific consideration of climate (I)

Crucial experiments like the famous experiment of Michelson e Morley are not possible in climate science

How is it possible a scientific investigation of climate ?



A scientific consideration of climate (II)

We can make experiments if we represent the climate system via a set of mathematical relations: the equation of climate.

The equation of climate are very difficult, but they can be solved by numerical methods.

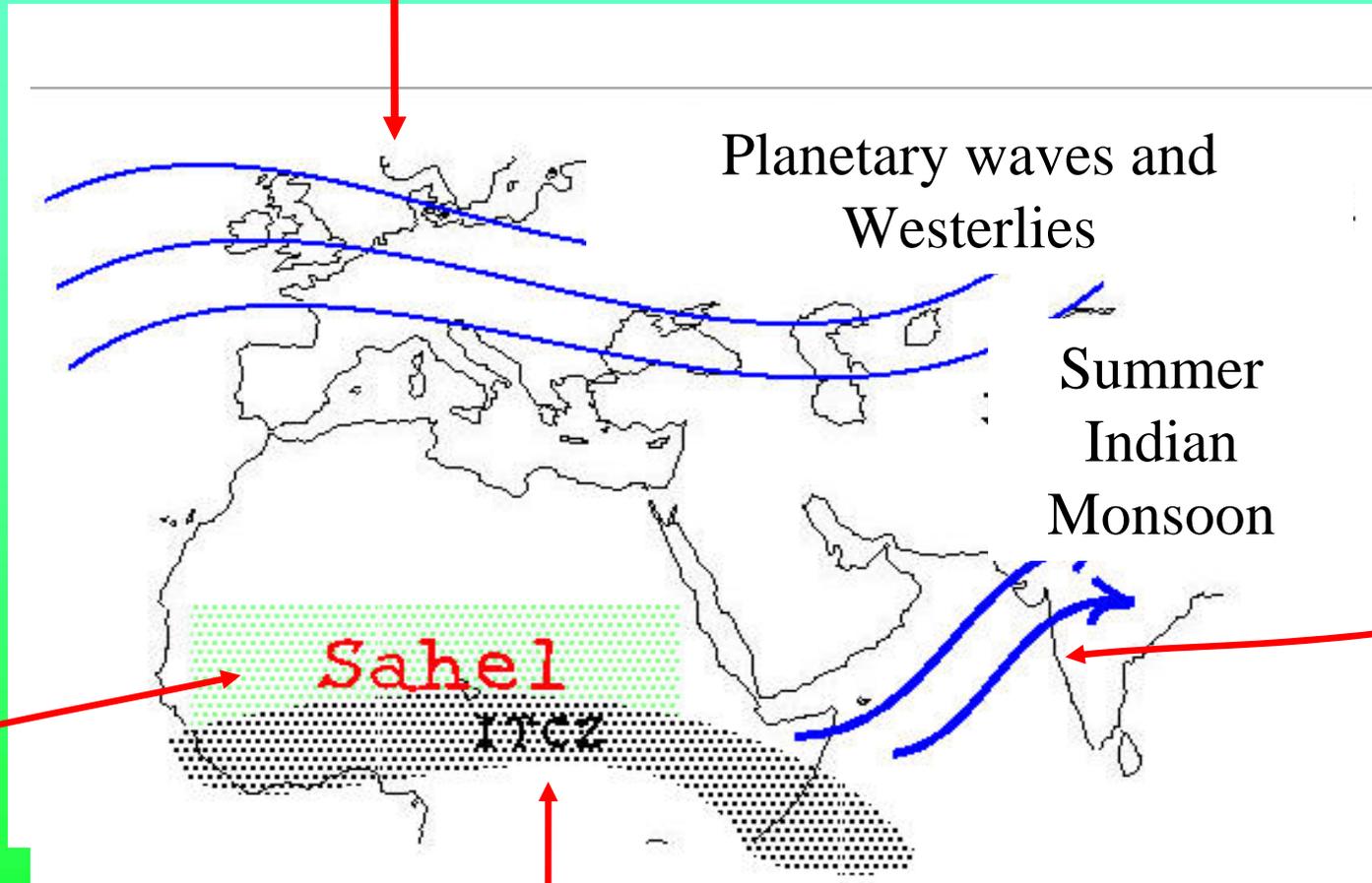
We can then treat very complex mathematical equations, paying the price of a enormous number of elementary operations.

The next generation of numerical models will be like new, more powerful, telescopes or particle accelerators and they will allow us to look further into the working of the Earth climate more accurately, extensively and reliably.

Afro-Indian Sector:

Mid-latitude Regimes

Indian Monsoon



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Sahel Region

InterTropical Convergence Zone

1. ORIENTGATE

Project title: A structured network for integration of climate knowledge into policy and territorial planning

Project duration: 30 months (starting July 1st 2012)

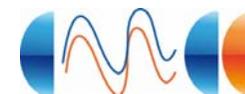
Total budget: 4,7 Mln Euro

Lead partner: CMCC

Total number of project partners: 34

Funding source: SEE Transnational Cooperation Programme (Interreg IVC)

Number of partners from EU	
Austria	2
Bulgaria	2
Greece	5
Hungary	5
Italy	6
Romania	2
Number of partners from Non EU	
Albania	1
Bosnia and Herzegovina	3
Croatia	2
Former Yugoslav Republic of Macedonia	1
Montenegro	1
Serbia	1
Ukraine	3
Total number of Project Partners	
	34



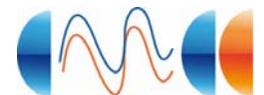
2. The partnership

- The South East Europe programme is a unique instrument which aims to improve integration and competitiveness in an area which is as complex as it is diverse.
- The ORIENTGATE partnership include a **majority of public authorities** (6 ministries, 7 regional public authorities, 5 municipalities, 1 env. agency).
- Three main categories of partners responding to different needs and having different roles:
 - **Nine national hydro-meteorological services** (HMS) as organisations responsible for monitoring climate variability and risk;
 - **Policy organisations of territorial development** as organisations responsible for translating the climate change risk assessment information into the planning instruments for the territorial development;
 - **Scientific institutions** with extensive expertise in sector specific vulnerabilities to climate variability and change



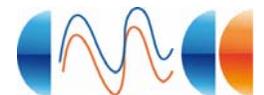
3. Project background and objective

- Over more than 40 years from the first climate numerical simulations, numerical methods have allowed enormous progress, enlarging the number and type of variables predicted, the range of the predictions and the type of sectors involved. Accuracy, reliability and scope of the forecasts have been steadily increasing:
 - *The knowledge is available, but it does not reach the final users and stakeholders with sufficient speed and quantity.*
- ORIENTGATE aims to build a partnership between the communities producing and applying the knowledge and experimental studies in order to coordinate the climate adaptation efforts across the South East European Countries.



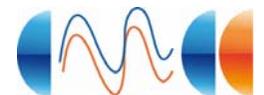
3.1 Project background and objective

- The project will:
 - i) develop a comprehensive and consistent methodology for assessing the risks prompted by the climate variability and change,
 - ii) harmonize the risk assessment and communication of the hydro-meteorological services,
 - iii) foster the uptake of the produced climate adaptation knowledge and experiences in the territorial planning and development, and
 - iv) enhance capacity to reconcile the risks and opportunities of environmental changes including warming earth



4. Project approach: main activities

- **Mapping and harmonising data across the SEE countries** to create a new cross-harmonized set of indicators answering to end users needs, and **development of downscaling scenarios** to be used in the pilot studies
- Set up of **three Thematic Centers** which will conduct 6 specific pilot studies:
 - **TC1 Forest and Agriculture** (2 pilots on adapted forest management in Austria and adaptation measures in Romanian agriculture)
 - **TC2 Drought, water, coasts** (3 pilots on water regime in Puglia, on wetland ecosystem in Attica, on hydroelectric use of water resources in Trento province)
 - **TC3 Urban adaptation and health** (1 pilot study on vulnerability assessment at Budapest and Veszprem)
- Development of a **Regional Planning Cross Sectoral Study** aimed at boosting the uptake of the produced knowledge of TC into territorial and sectoral policies
- Development of a **Data Platform** and design and implementation of a **dashboard monitoring and browsing tools** designed to provide access to data and metadata of climate observations and simulations.
- Extensive and coordinated **communication activities**.



Il Concetto di Sicurezza

Il Concetto di Sicurezza e' cambiato negli anni:
passando da una visione politico-militare ad una piu' ampia,
che include gli aspetti militari, politici, economici, sociali
ed ambientali.

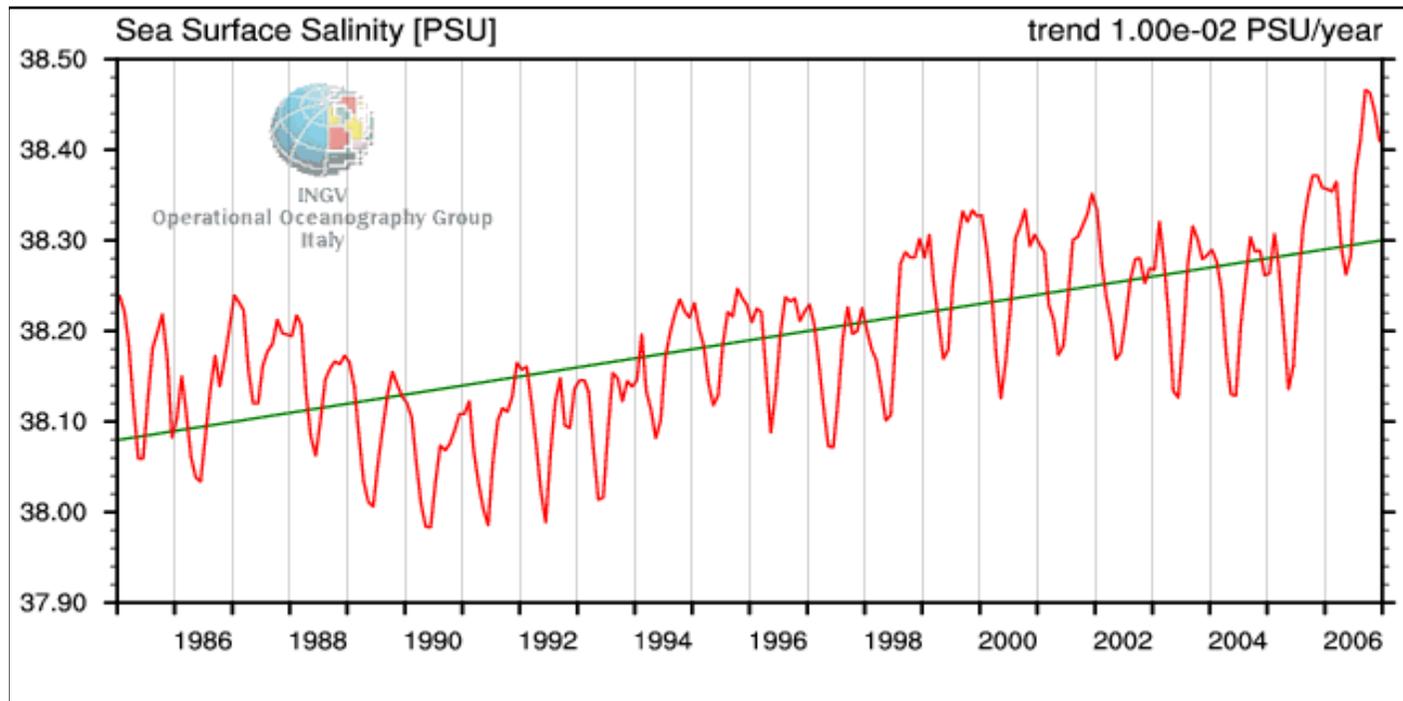
*Per sicurezza ambientale s'intende garantire la sicurezza umana
attraverso il mantenimento del sistema di supporto ambientale.*

risorse

- Riduzione e degradazione della disponibilità
- Riduzione e degradazione da sovraconsumo
- Riduzione strutturale dovuta a asimmetrie di distribuzione

Il processo di 'salinizzazione' del Mediterraneo

Salinità superficiale nel Mediterraneo (psu)

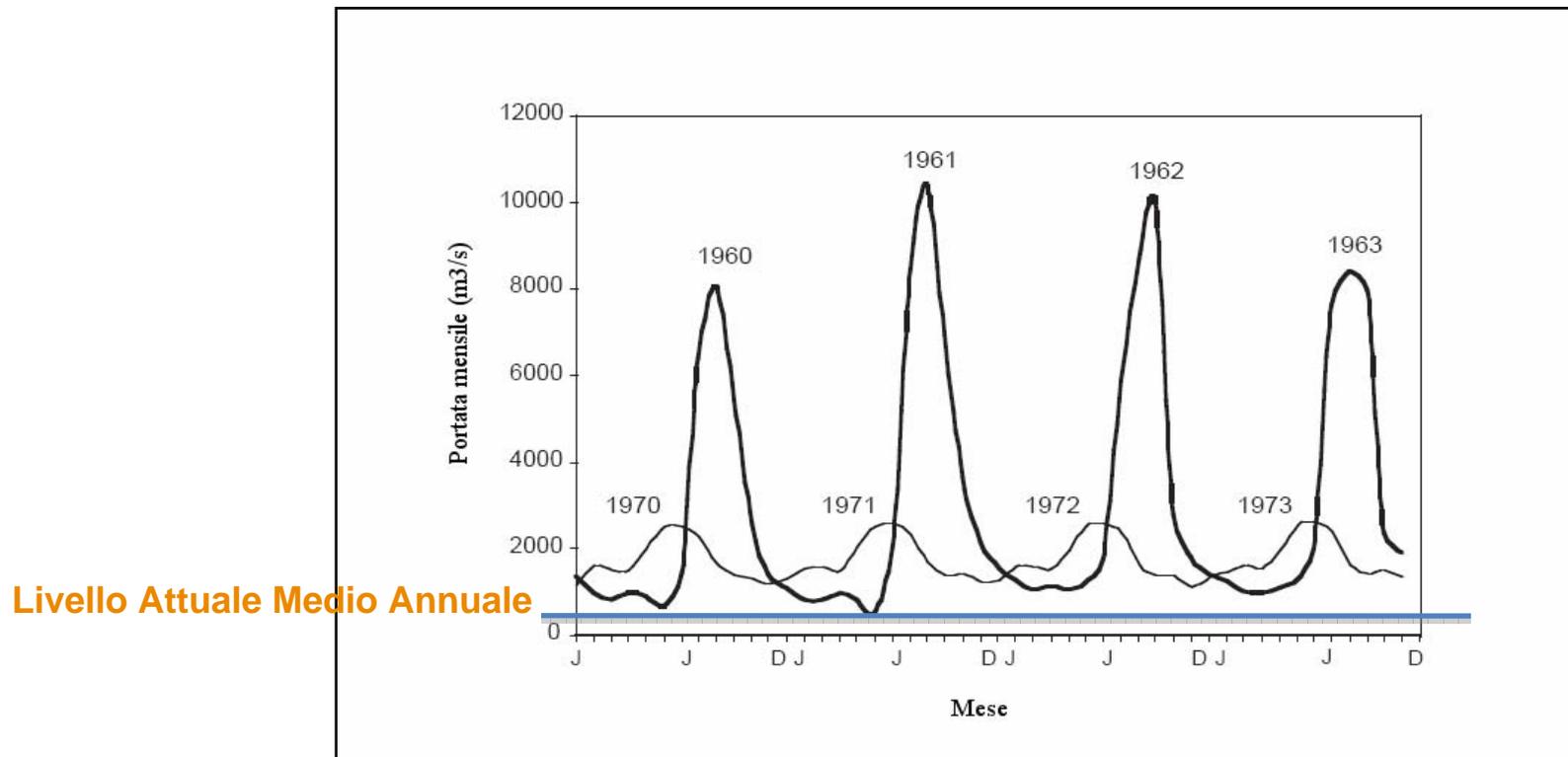


Anomalia di salinità (psu)

... in parte dovuto ad Aswan?

Effetti della costruzione dell'alta diga di Aswan:

- drastica riduzione del volume d'acqua in grado di raggiungere il delta e quindi il Mediterraneo
- perdita di acqua dal bacino artificiale per evaporazione, circa 10 km³ all'anno



Da Nixon (2003).

Il bacino del Nilo

Il presente trattato riserva l'80%
Delle risorse per l'Egitto e il Sudan



New York Times, Sept.26

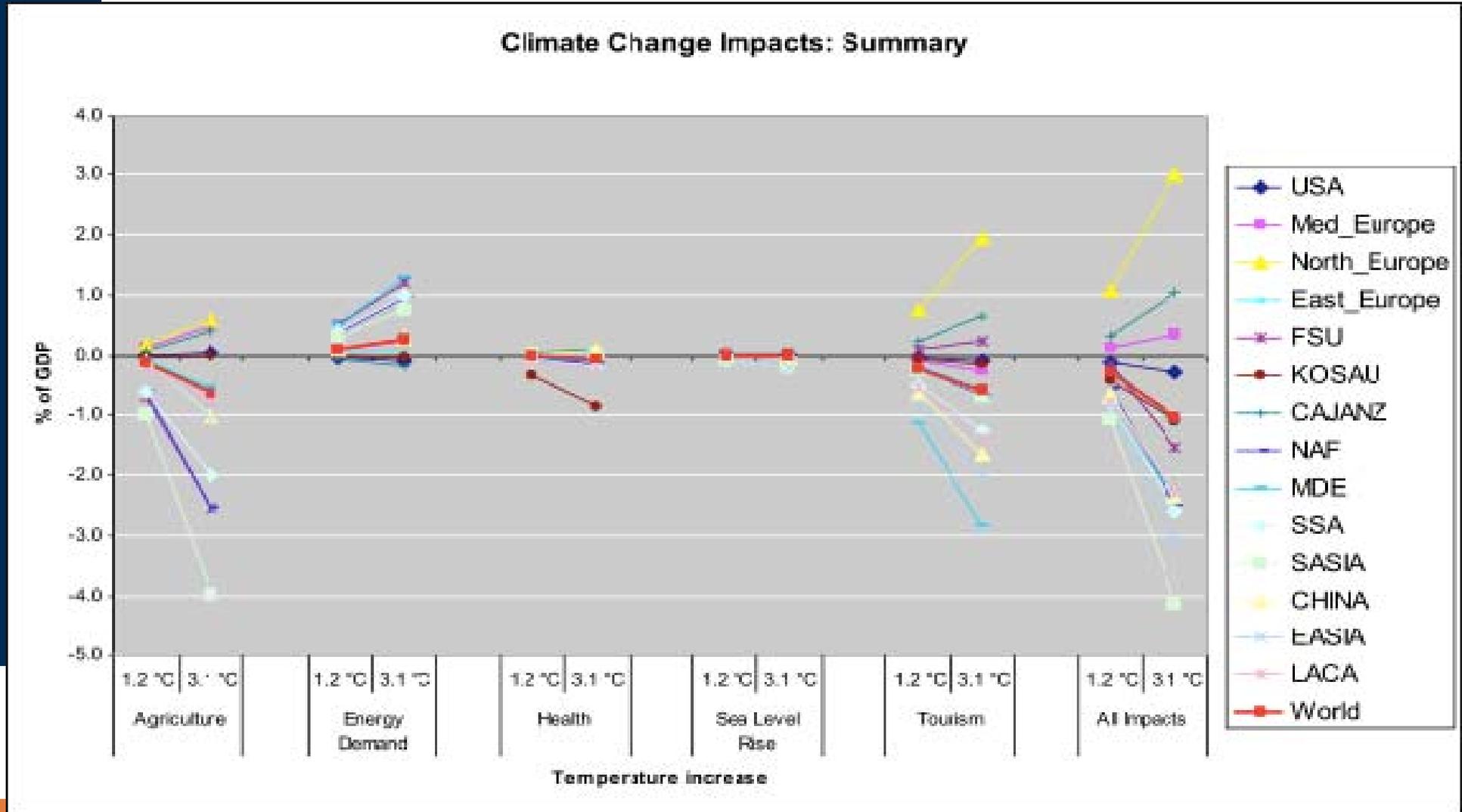
Una strategia flessibile

I cambiamenti climatici possono aggravare i problemi di sicurezza nelle aree sensibili. La disponibilità di acqua può aprire un nuovo teatro di minacce alla sicurezza, potenzialmente in rapida evoluzione.

Una strategia di risposta a breve può rivelarsi inefficace a lungo termine e d'altra parte una strategia disegnata per il lungo termine può essere inadeguata ai bisogni immediati.

La strategia deve essere flessibile ed evolvere insieme all'evoluzione della minacce alla sicurezza

CC impact de-composition (% GDP in 2050)



Source: CMCC CIP Division (2009)

Conclusioni

L'impatto sulla sicurezza dei cambiamenti climatici e' il risultato di una catena di eventi, come la perdita di risorse o migrazioni, che interagiscono tra loro dinamicamente.

Una semplice valutazione causa-effetto rischia di non valutare correttamente l'estensione del rischio sicurezza.

Le dimensioni di questa cascata di cambiamenti determinano le richieste per le strategie di sicurezza e le loro priorit .



Thanks