



METEOROLOGIA

MERCOLEDÌ 11 OTTOBRE 2023

Quanta energia c'è nell'aria? Atmosfera e Oceani in una danza termodinamica

MERCOLEDÌ 25 OTTOBRE 2023

L'uomo o la macchina: chi sbaglia le previsioni?

MERCOLEDÌ 15 NOVEMBRE 2023

Prevedere il tempo a lunga scadenza è possibile?

MERCOLEDÌ 29 NOVEMBRE 2023

Il meraviglioso complesso che si chiama Clima

MERCOLEDÌ 13 DICEMBRE 2023

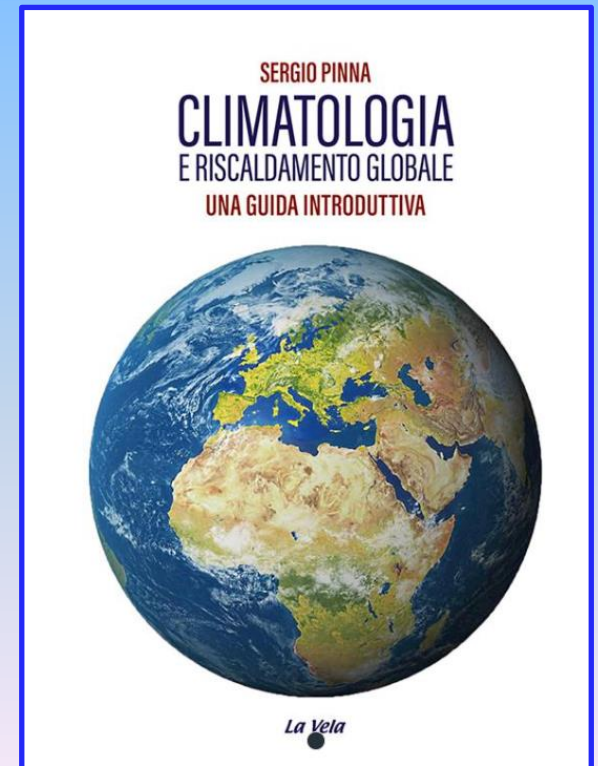
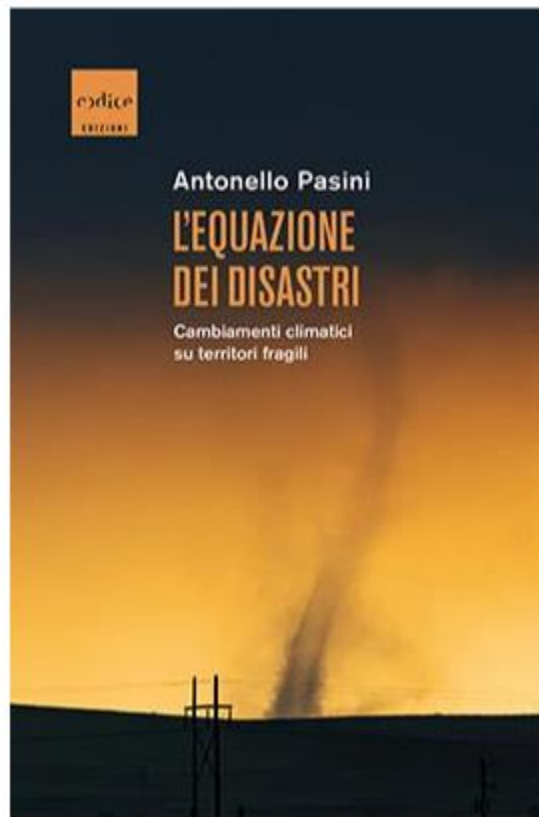
L'effetto serra: amico o nemico?

MERCOLEDÌ 10 GENNAIO 2024

E se guardassimo al Sole?



Per saperne di più.....





Meteorologia

Quanta energia c'è
nell'aria?

ATMOSPHERE

EXOSPHERE

THERMOSPHERE

MESOSPHERE

STRATOSPHERE

Sistema complesso

i cui processi determinano il

“tempo meteorologico”



LA METEOROLOGIA

(greco: *Μετεωρολογία*) è una specializzazione
della **Fisica dell'Atmosfera**

**Studia fenomeni fisici responsabili del
tempo atmosferico.**

Analisi Stato Attuale Atm.

Previsione Stato Futuro Atm.



WEATHER

**SHORT-TERM STATE OF
THE ATMOSPHERE**



Rain



**Can change within
minutes or hours**

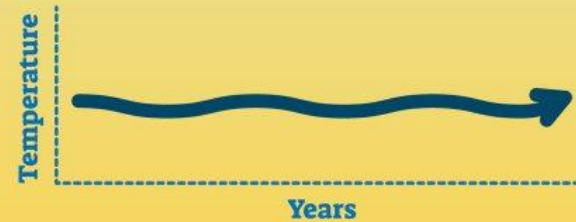


CLIMATE

**LONG-TERM PATTERN
OF WEATHER**



Tropical Climate



**Average weather over
many years in one
specific place**



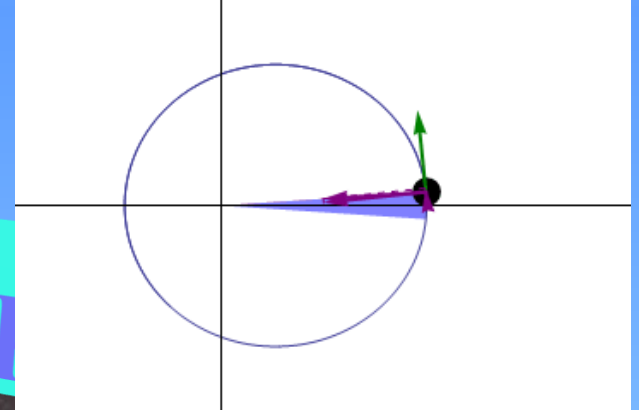
TEMPO E CLIMA

Il **Clima** è ciò che ti aspetti

Il **Tempo** è ciò che trovi

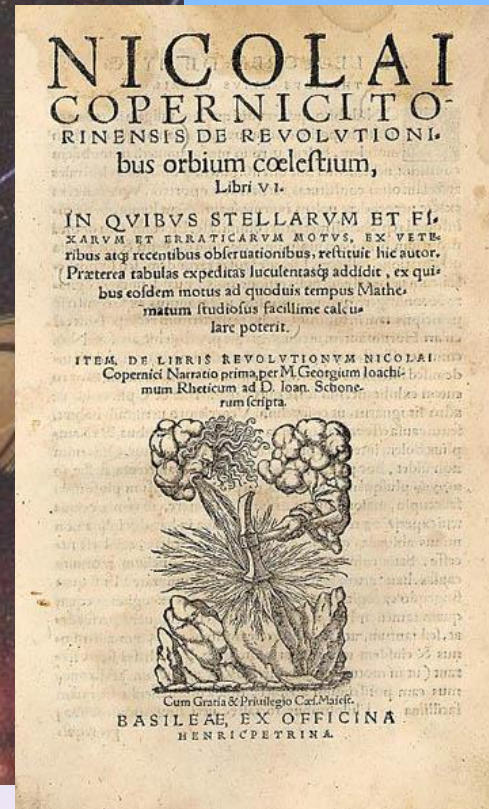
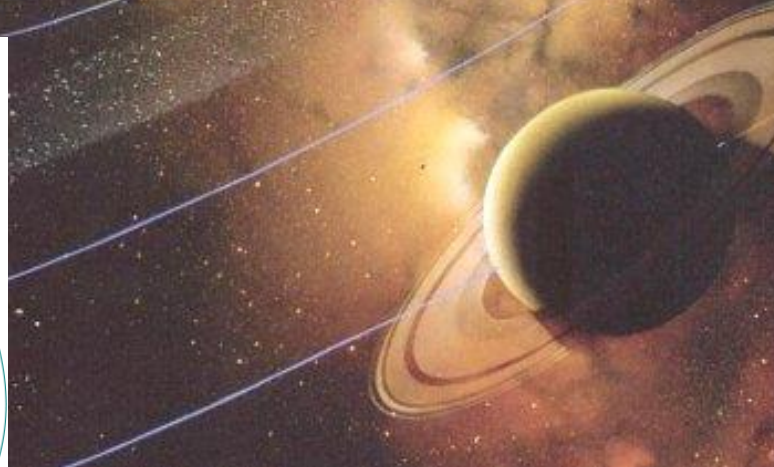
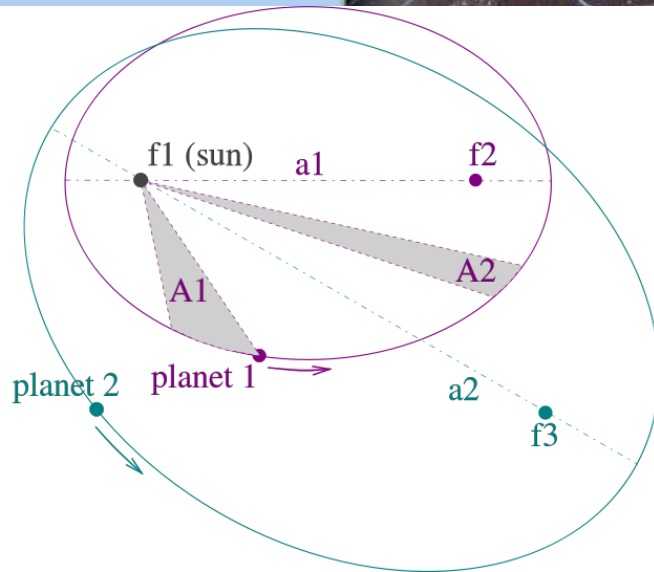
Il Sistema solare

Aristotele – Galileo – Copernico



Orbite ellittiche

Leggi Keplero

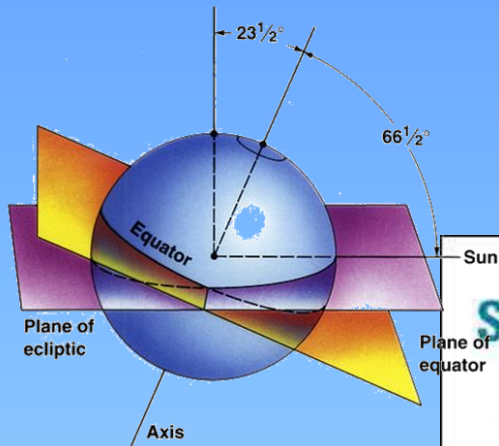


Circolazione generale Atmosfera

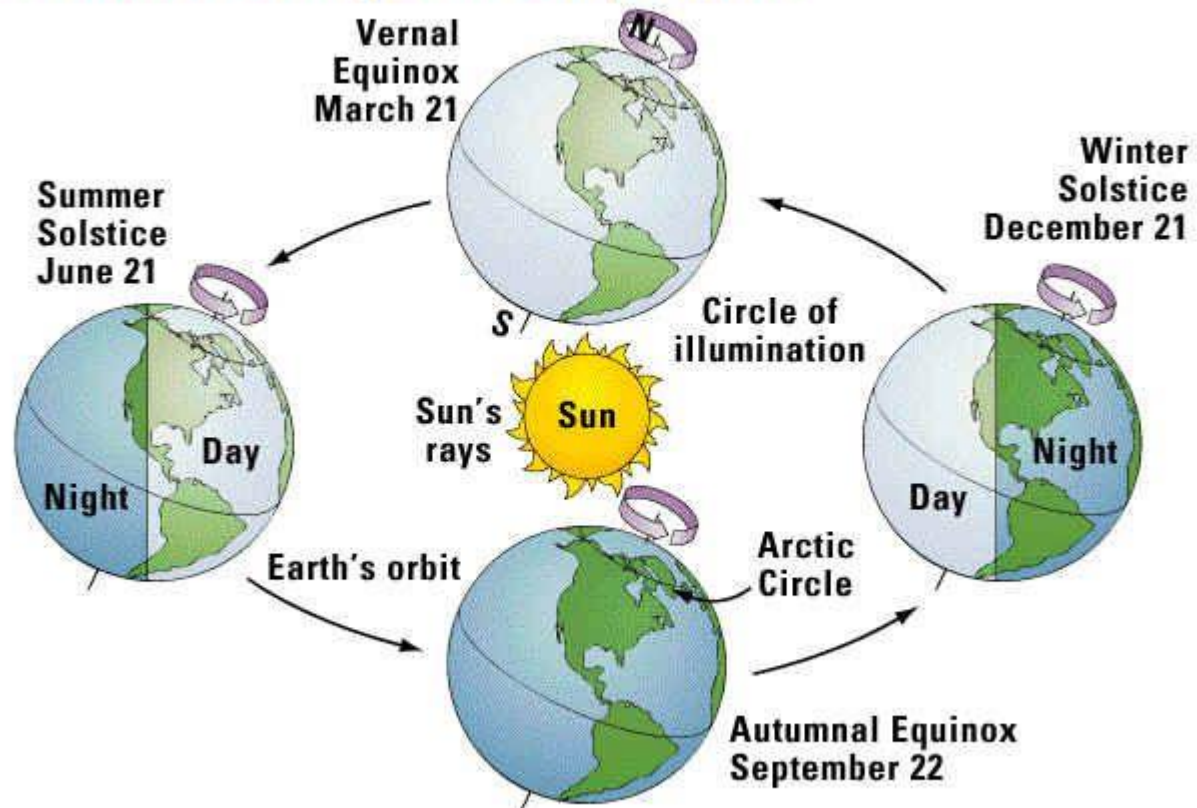


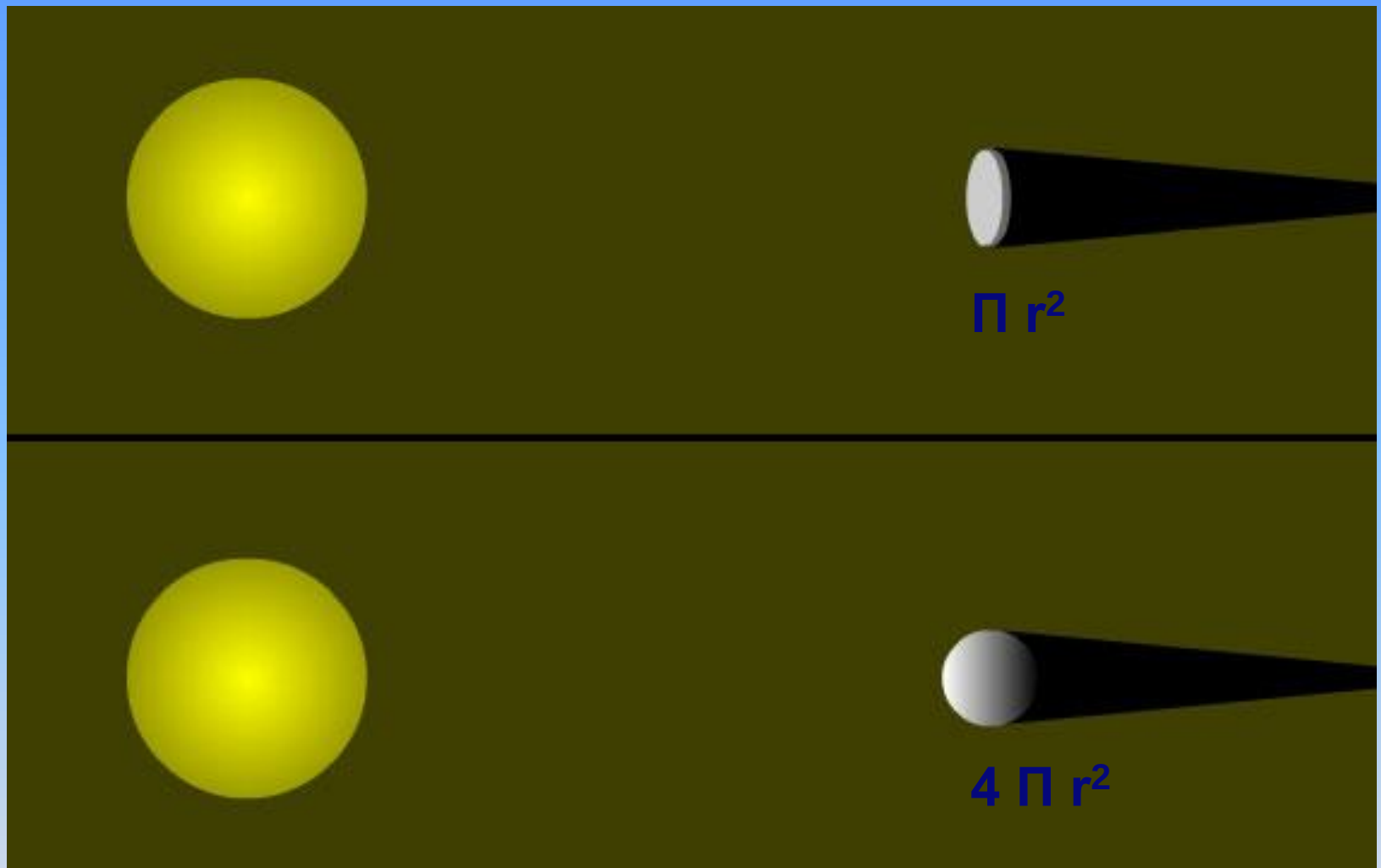
Piano rotazione e piano rivoluzione non complanari!!!!

Le stagioni



Seasonal changes in temperature

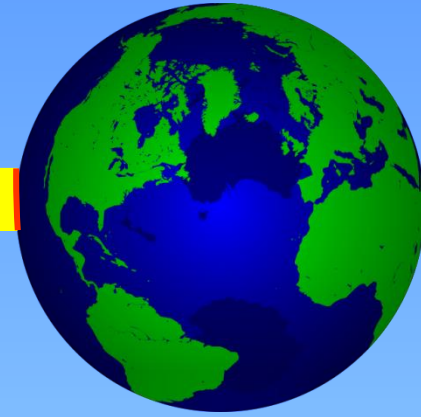




1366 W/m² diventa 342 W/m²
su tutta la superficie terrestre

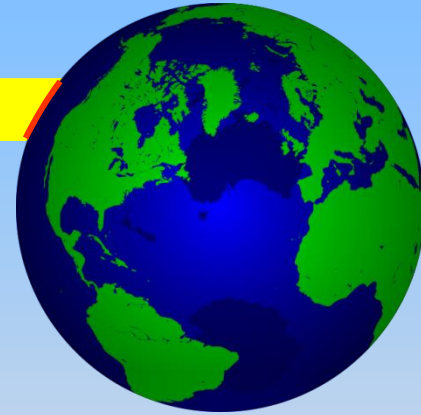
Equatore

Area del raggio solare 1 m²



30° N

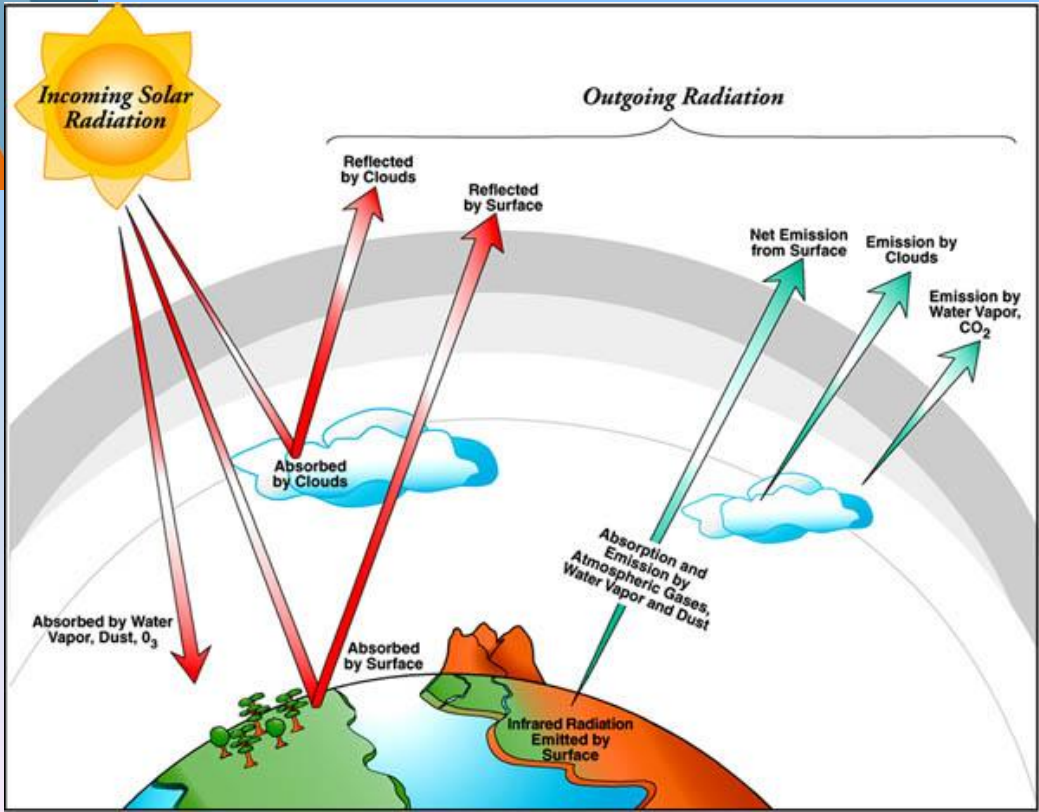
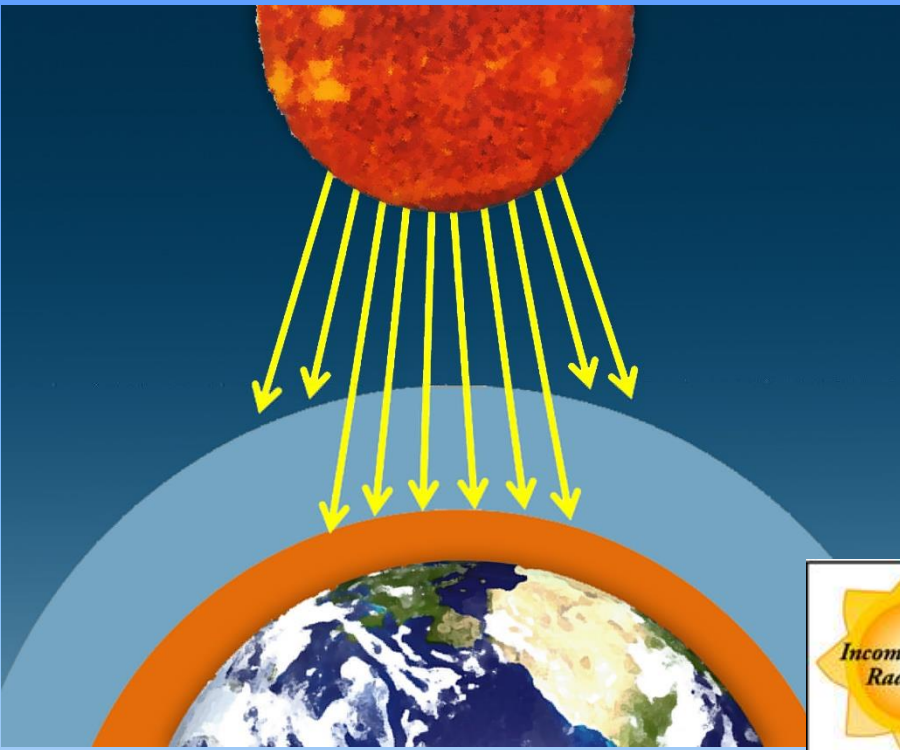
Energia 87% di quella Equatore



60° N

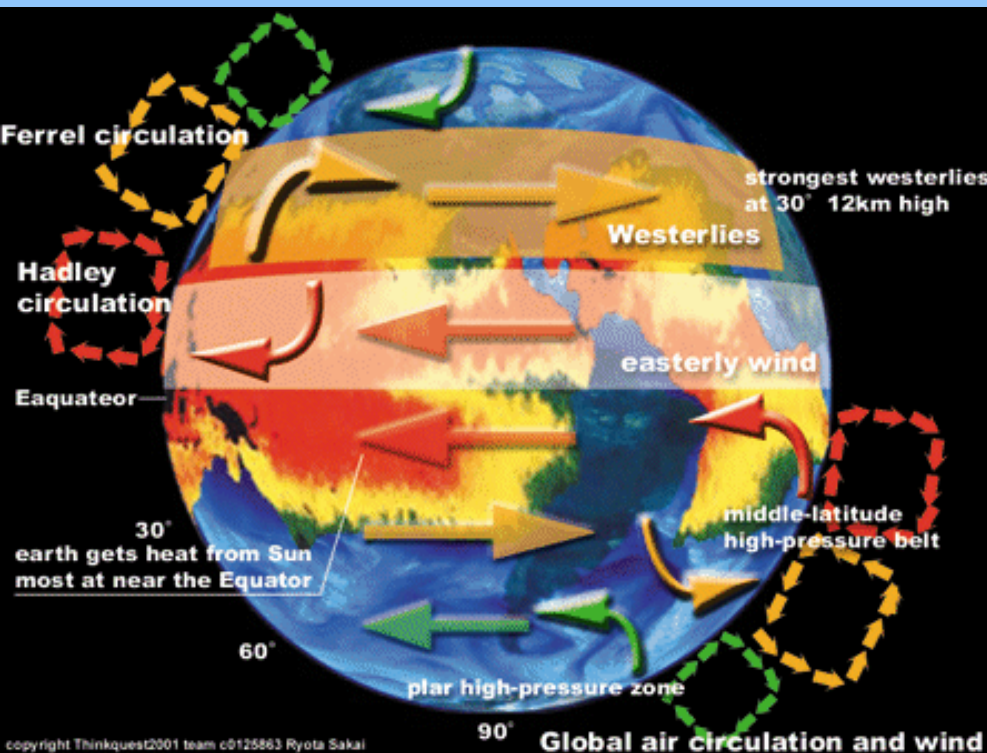
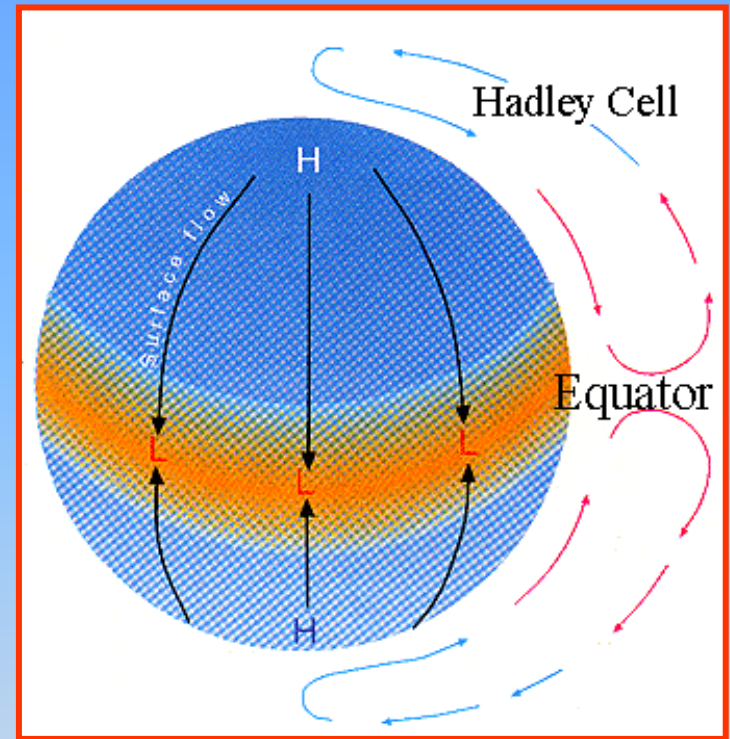
Energia 50% di quella Equatore





Circolazione generale

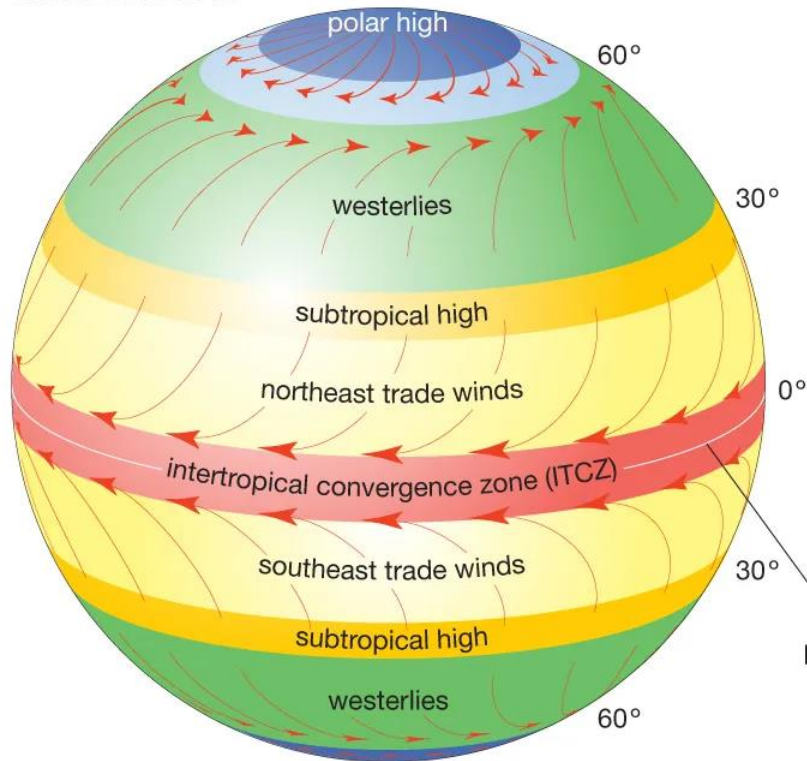
Senza rotazione terrestre



con rotazione terrestre

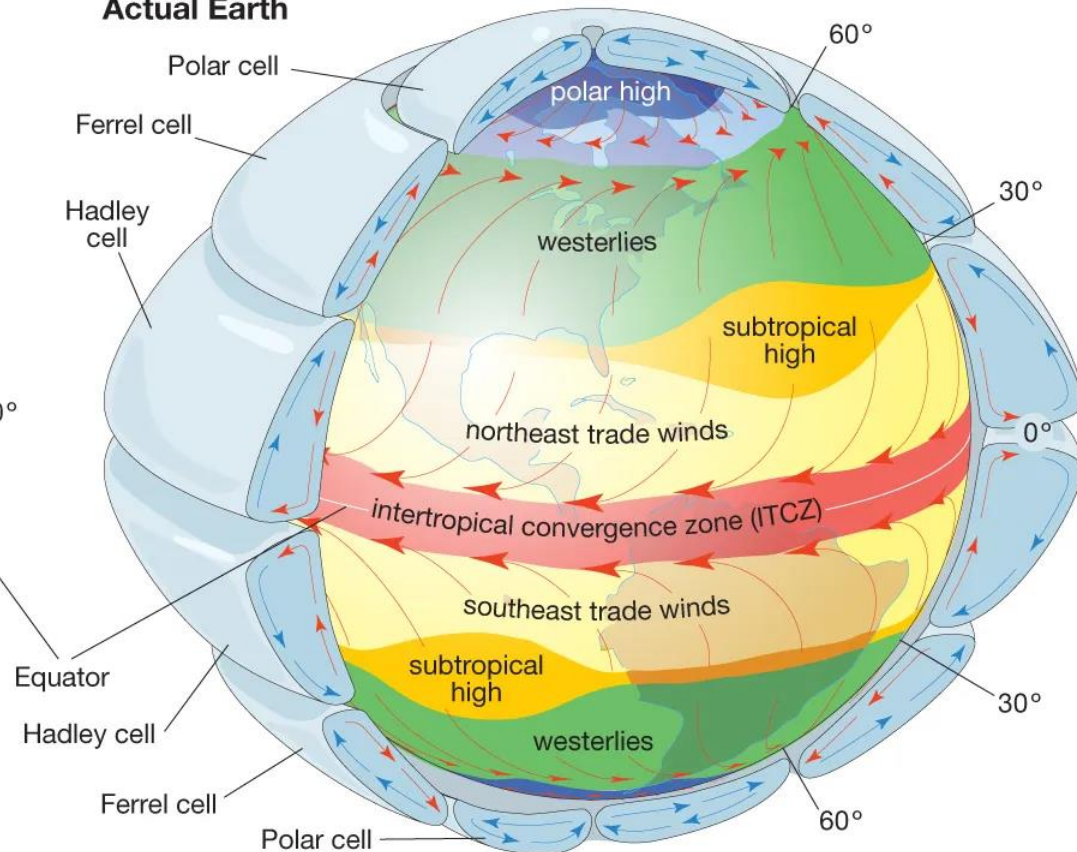
Circolazione generale

Idealized Earth



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Actual Earth



Ci

10 km

12.742 Km

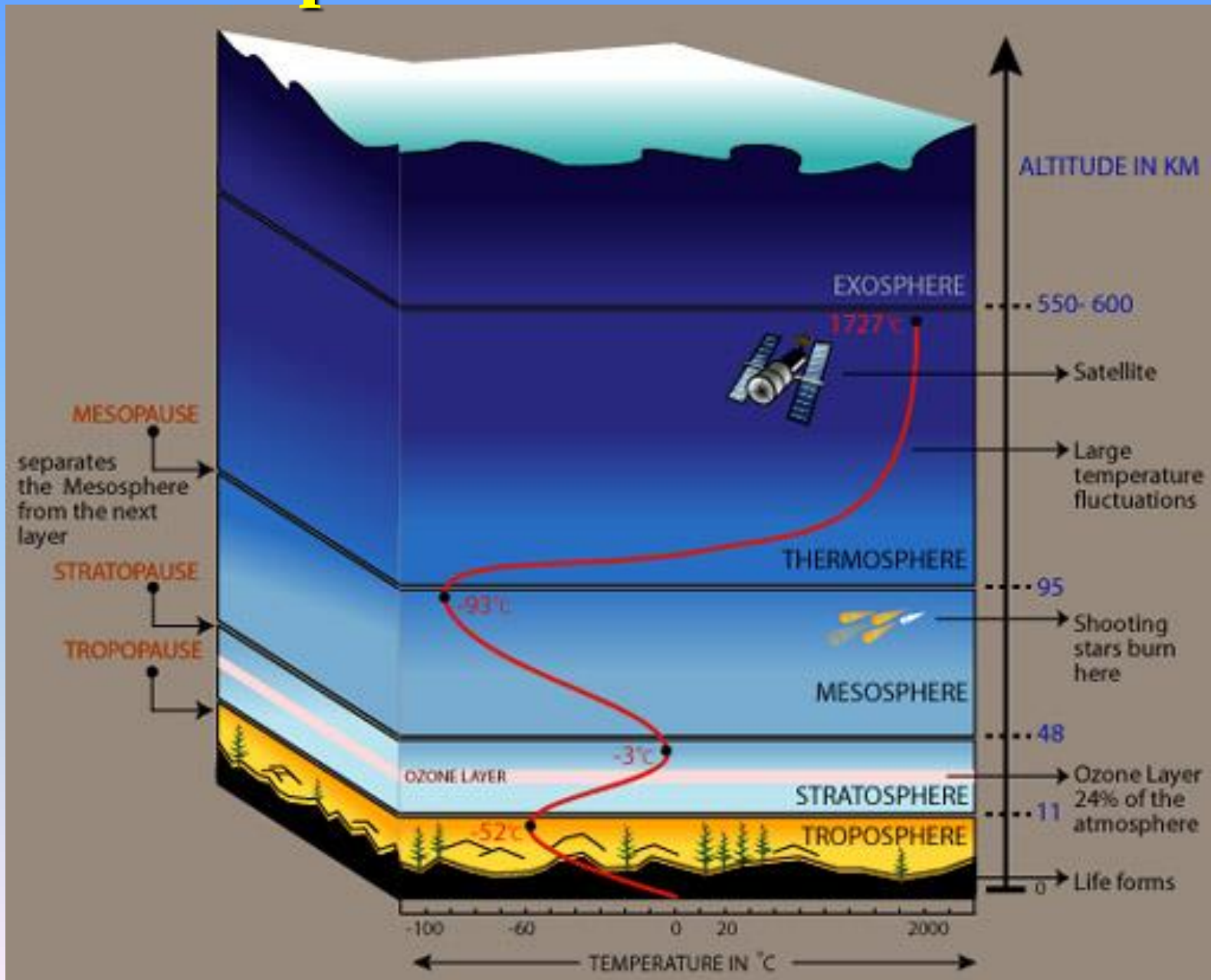


Sc

Low level

Mean
sea level

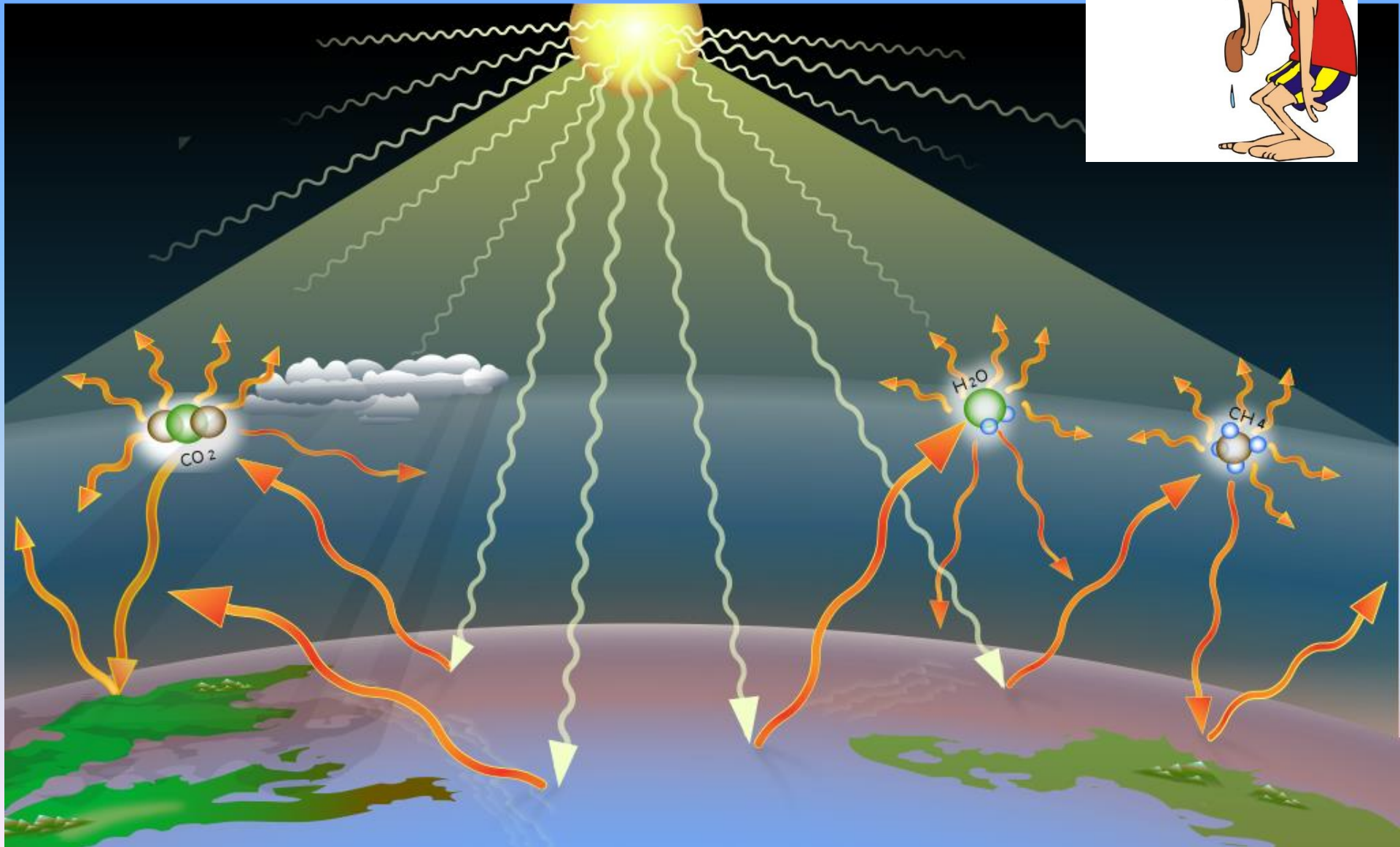
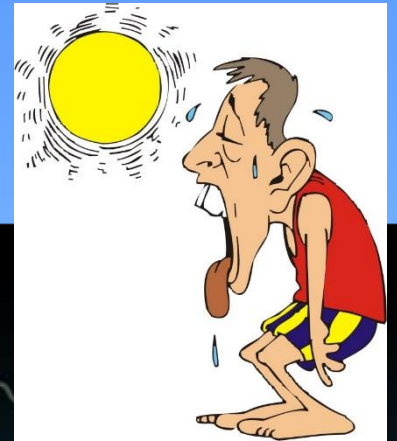
La Temperatura dell'Atmosfera



Composizione Chimica Atmosfera

gas / vapore (sostanza)	peso mol g	densità in cond. std kg/m3	percentuale volumetrica % o ppm		contenuto molare moli/m3	contenuto in molecole molecole/m3
						
azoto (N ₂)	28,01	1,251	78,084	%	34,87436059	2,10E+25
ossigeno (O ₂)	32	1,429	20,946	%	9,353698125	5,63E+24
argon (Ar)	39,95	1,783	0,934	%	0,416851564	2,51E+23
neon (Ne)	20,18	0,9	18,18	ppm	8,108E-04	4,88E+20
elio (He)	4,003	0,1785	5,24	ppm	2,337E-04	1,41E+20
monossido di azoto (NO)	30,01	1,34	5	ppm	2,233E-04	1,34E+20
kripton (Kr)	83,8	3,68	1,14	ppm	5,006E-05	3,01E+19
metano (CH ₄)	16,04	0,7167	1,7	ppm	7,596E-05	4,57E+19
idrogeno (H ₂)	2,02	0,0899	0,55	ppm	2,448E-05	1,47E+19
ossido di diazoto (N ₂ O)	44,01	1,98	0,5	ppm	2,249E-05	1,35E+19
xeno (Xe)	131,3	5,85	0,087	ppm	3,876E-06	2,33E+18
ossido di carbonio (CO)	28,01	1,2501	0,2	ppm	8,926E-06	5,38E+18
biossido di zolfo (SO ₂)	64,06	2,9268	0,01	ppm	4,569E-07	2,75E+17
ozono (O ₃)	48	2,144	0,02	ppm	8,933E-07	5,38E+17
anidride carbonica (CO ₂)	44	1,9768	412,5	ppm	1,853E-02	1,12E+22
vapor acqueo (H ₂ O)	18,016	0,804	1924,1	ppm	8,587E-02	5,17E+22

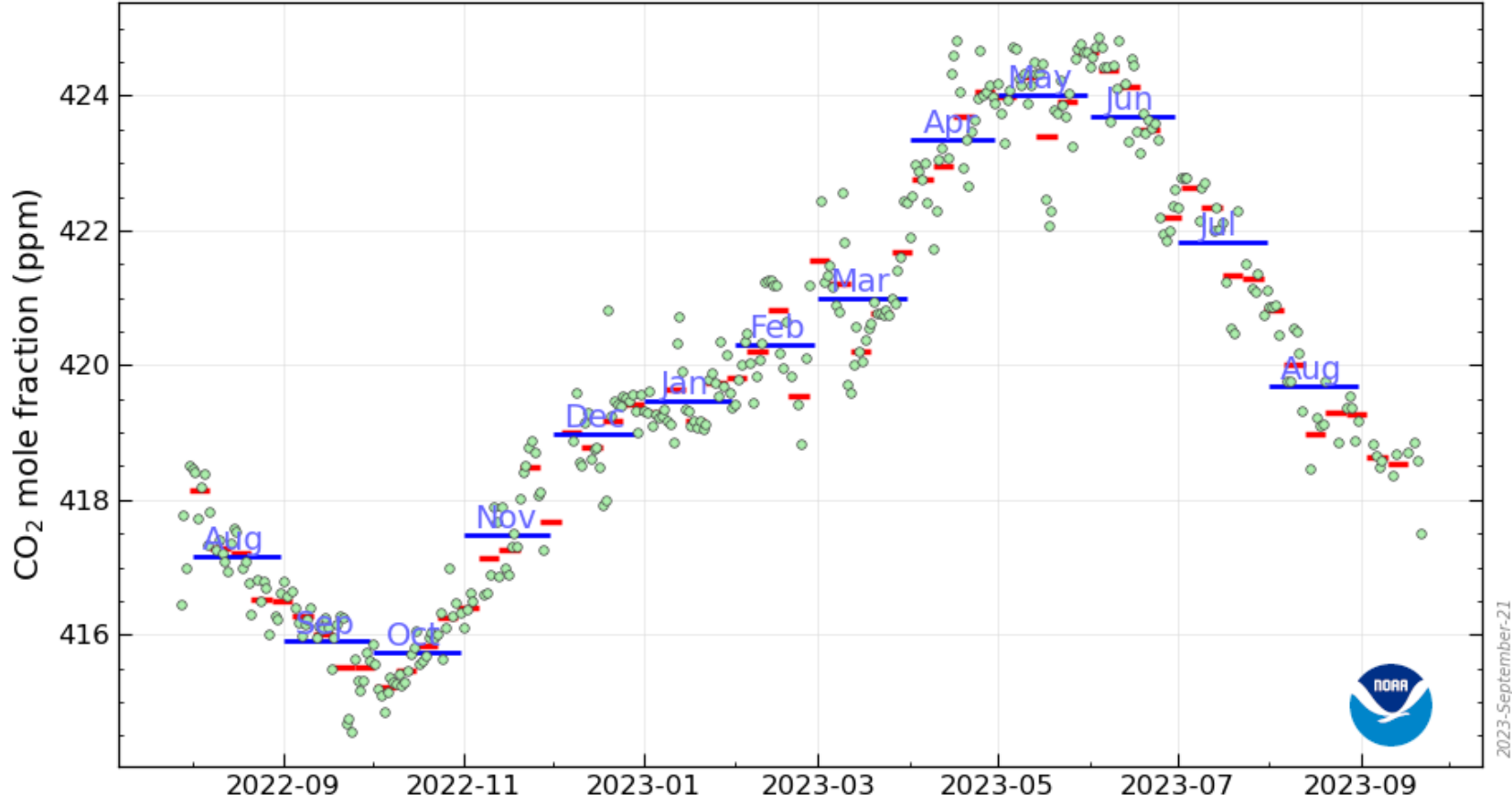
I gas serra



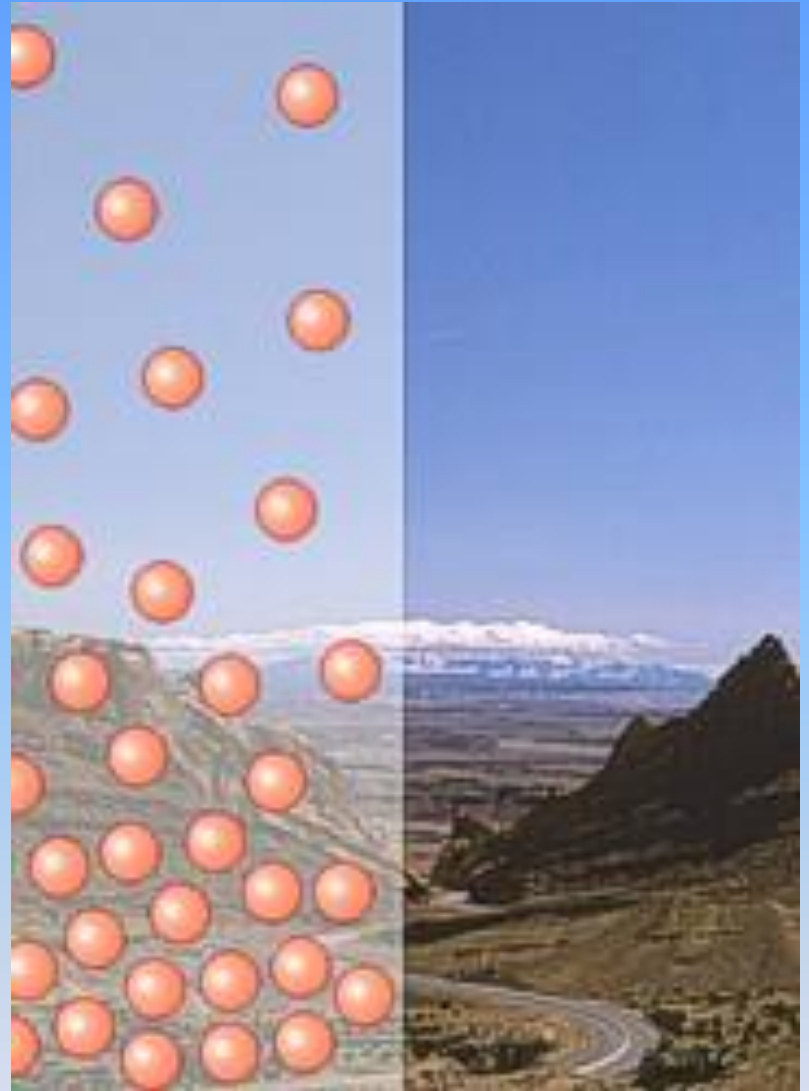
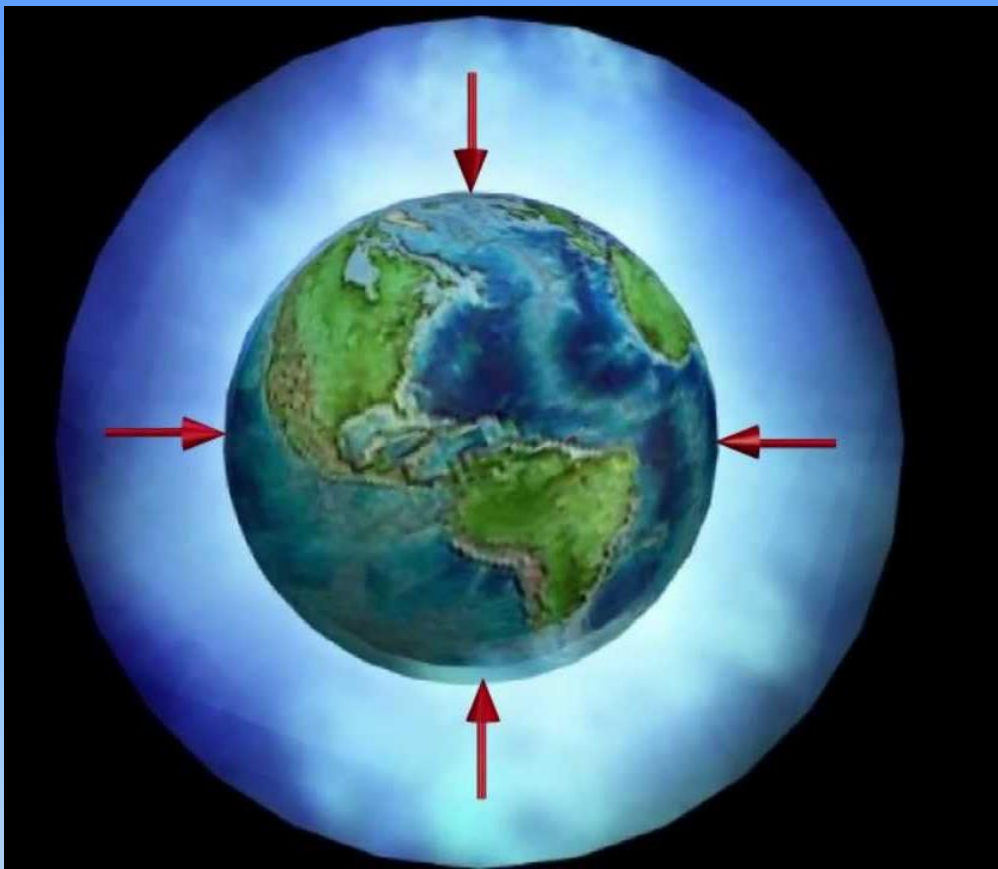
Weekly average CO₂ at Mauna Loa

Week beginning on September 10, 2023: 418.52 ppm
Weekly value from 1 year ago: 416.15 ppm
Weekly value from 10 years ago: 393.52 ppm
Last updated: September 21, 2023

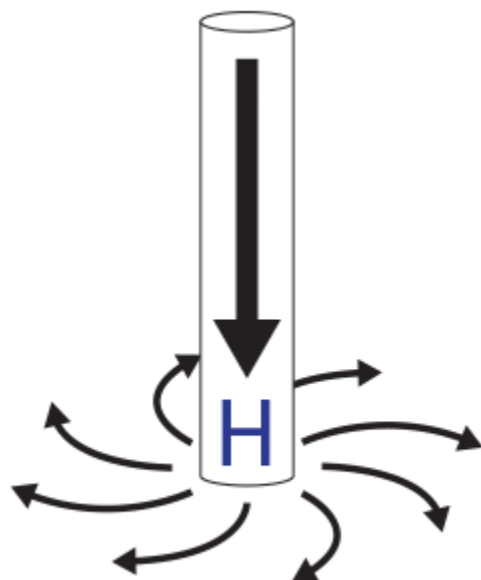
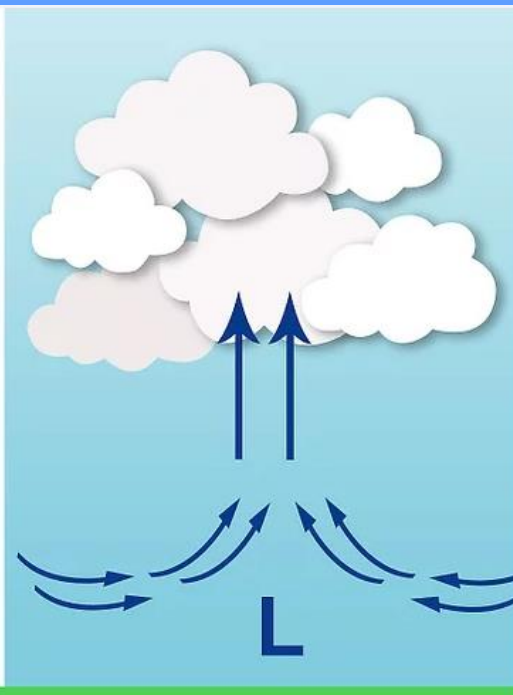
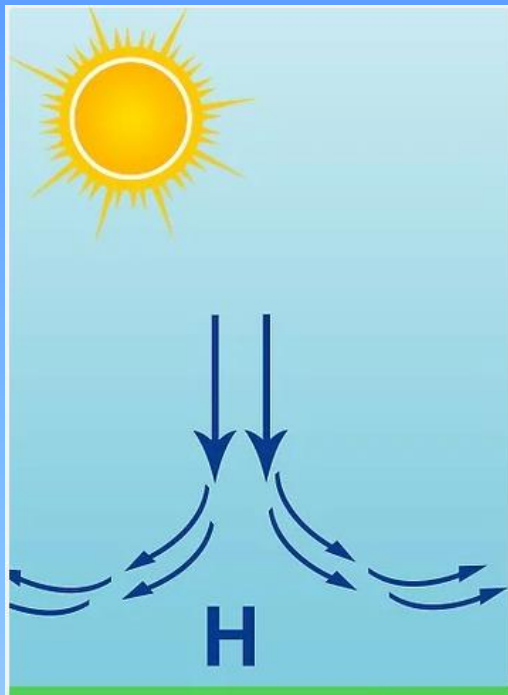
One year of CO₂ daily and weekly means at Mauna Loa



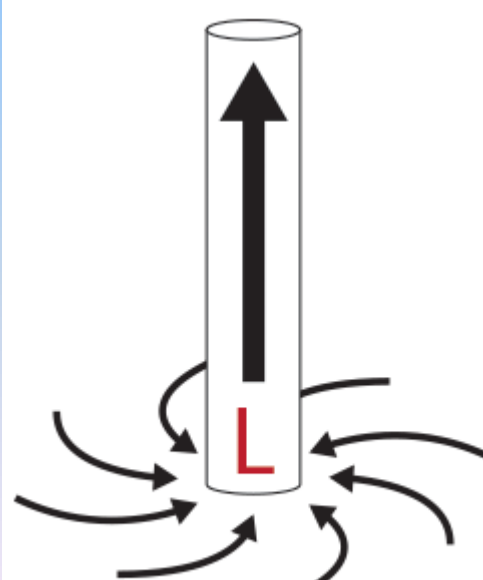
2023-September-21



Pressione atmosferica



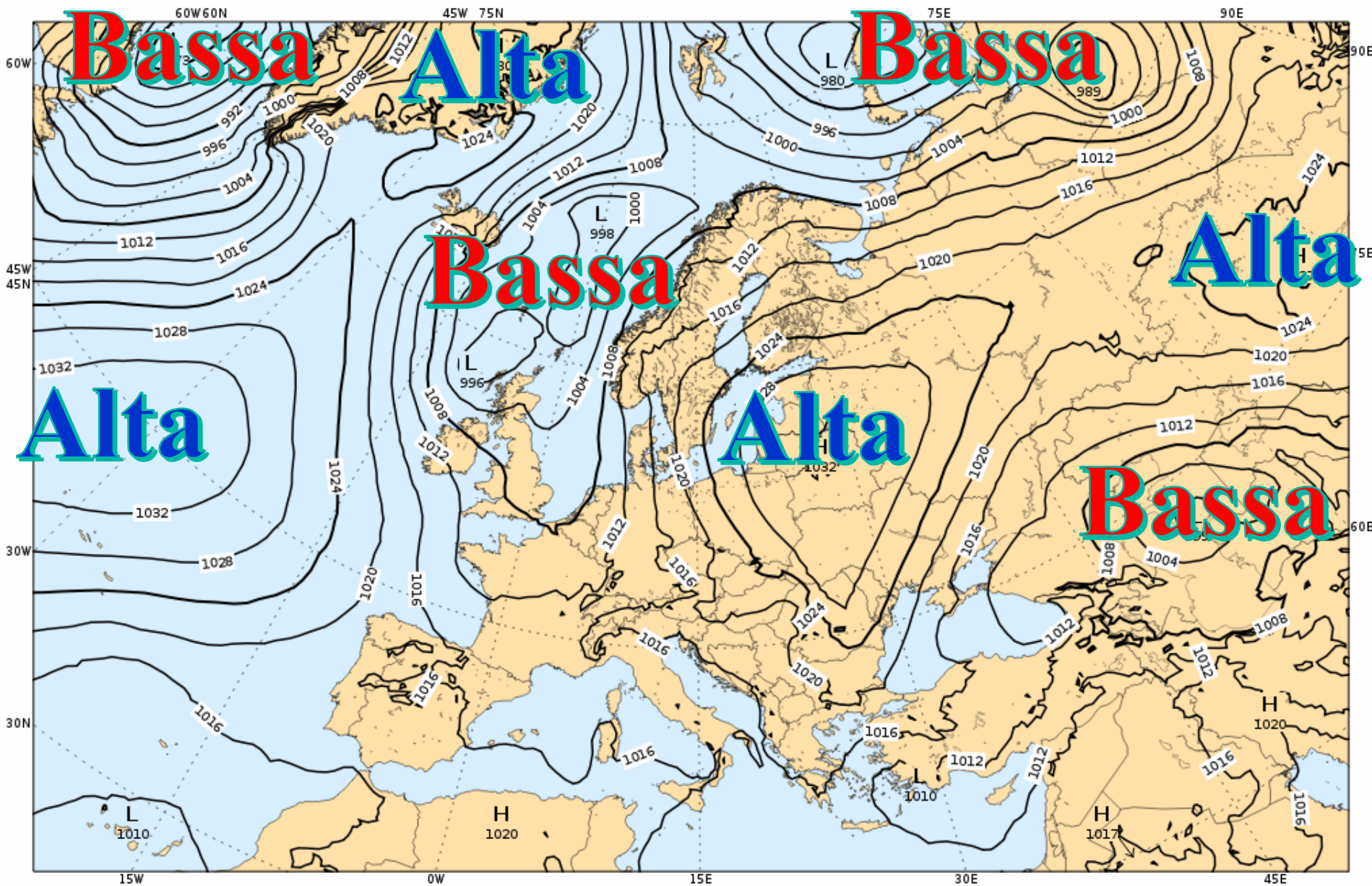
Alta Pressione



Bassa Pressione



Pressione al livello del mare (hPa)



Il vento

Un po' di storia



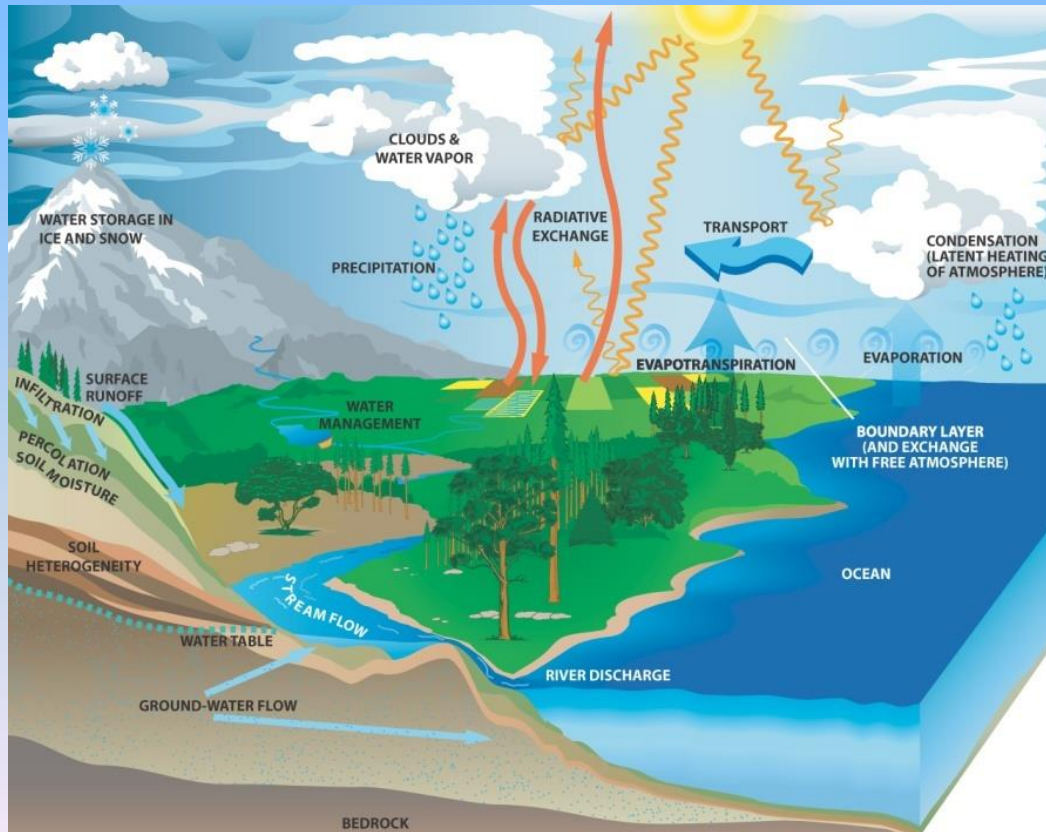
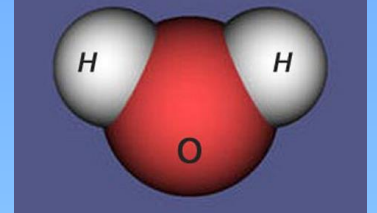
Origine della Rosa dei Venti





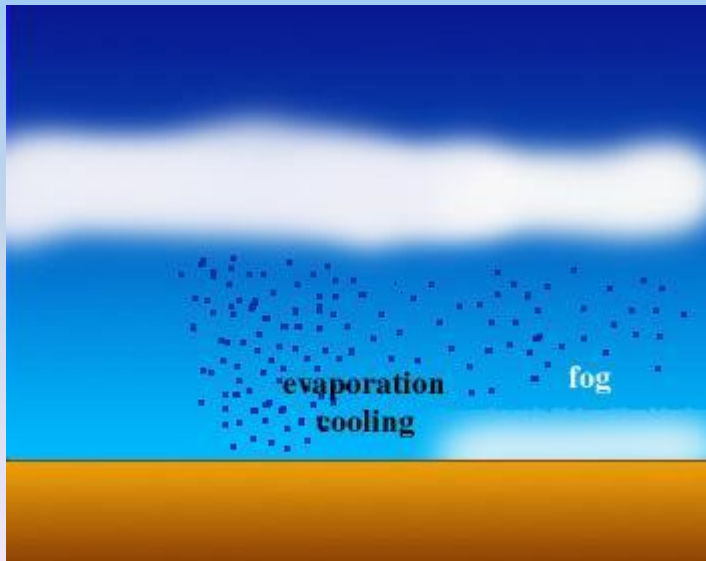
Aria = miscela di gas

Compreso il vapore acqueo

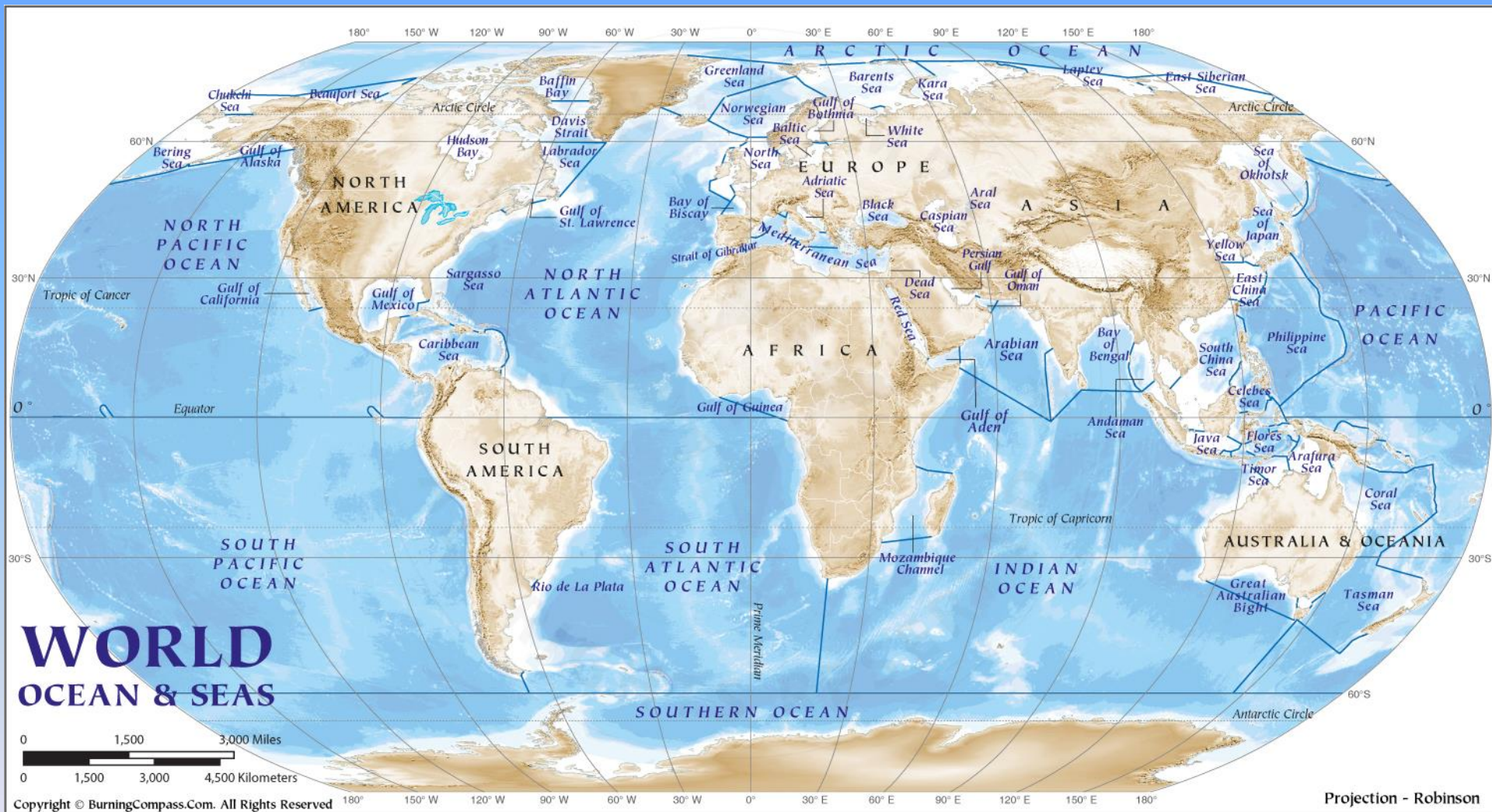


L'aria può contenere diverse porzioni di vapore

Al di sopra di una soglia si ha la saturazione e quindi condensazione

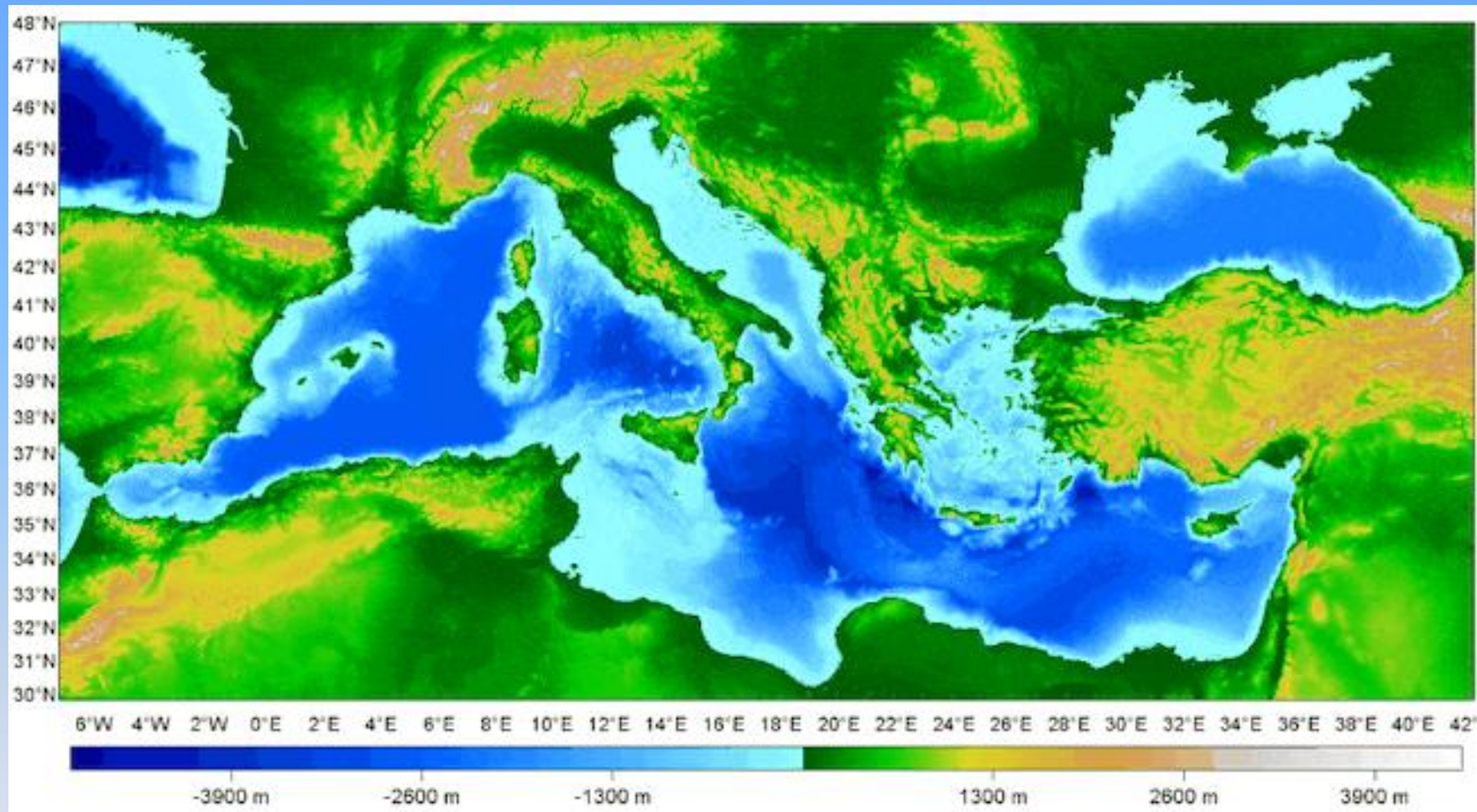


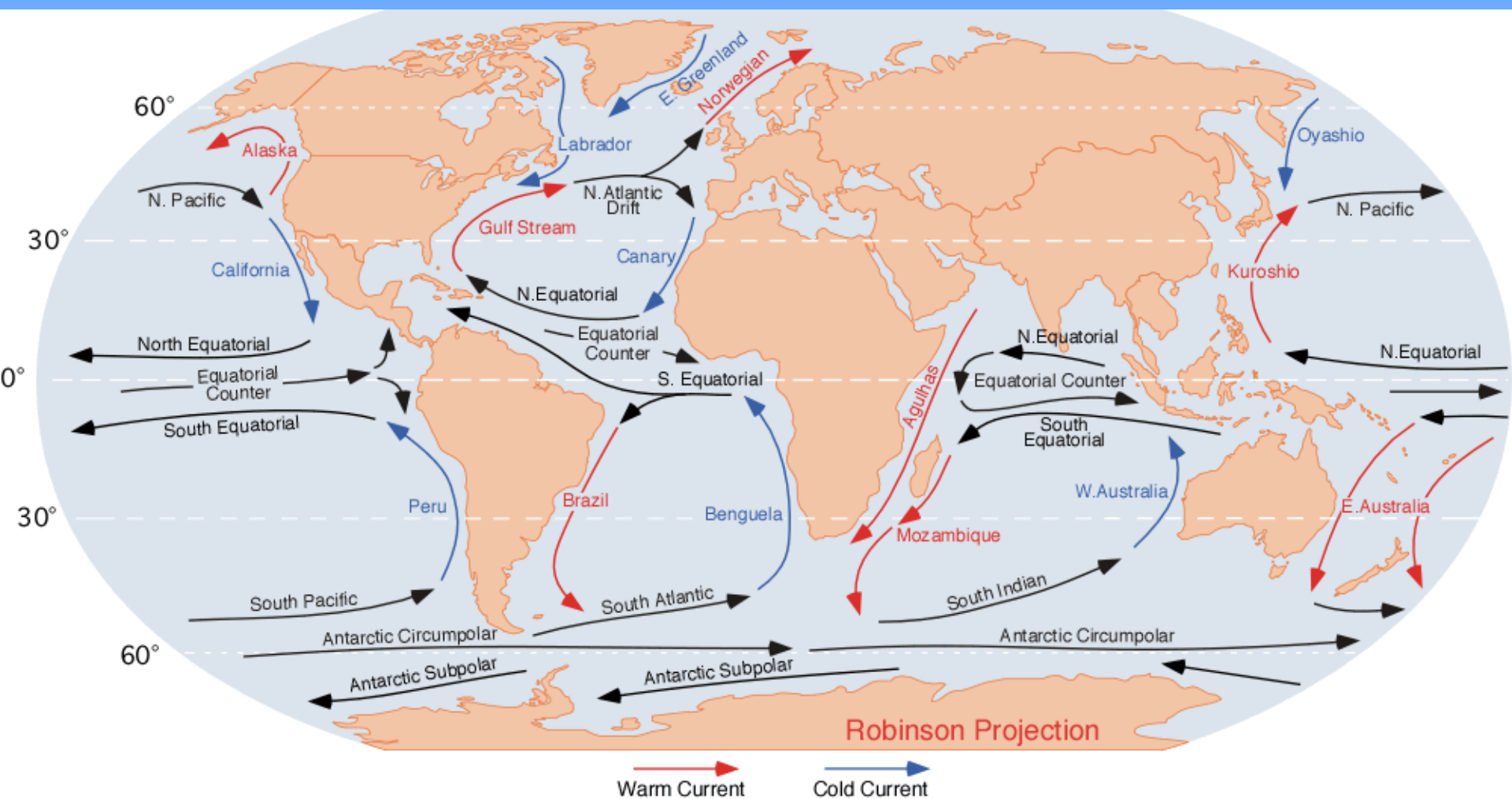
Gli Oceani



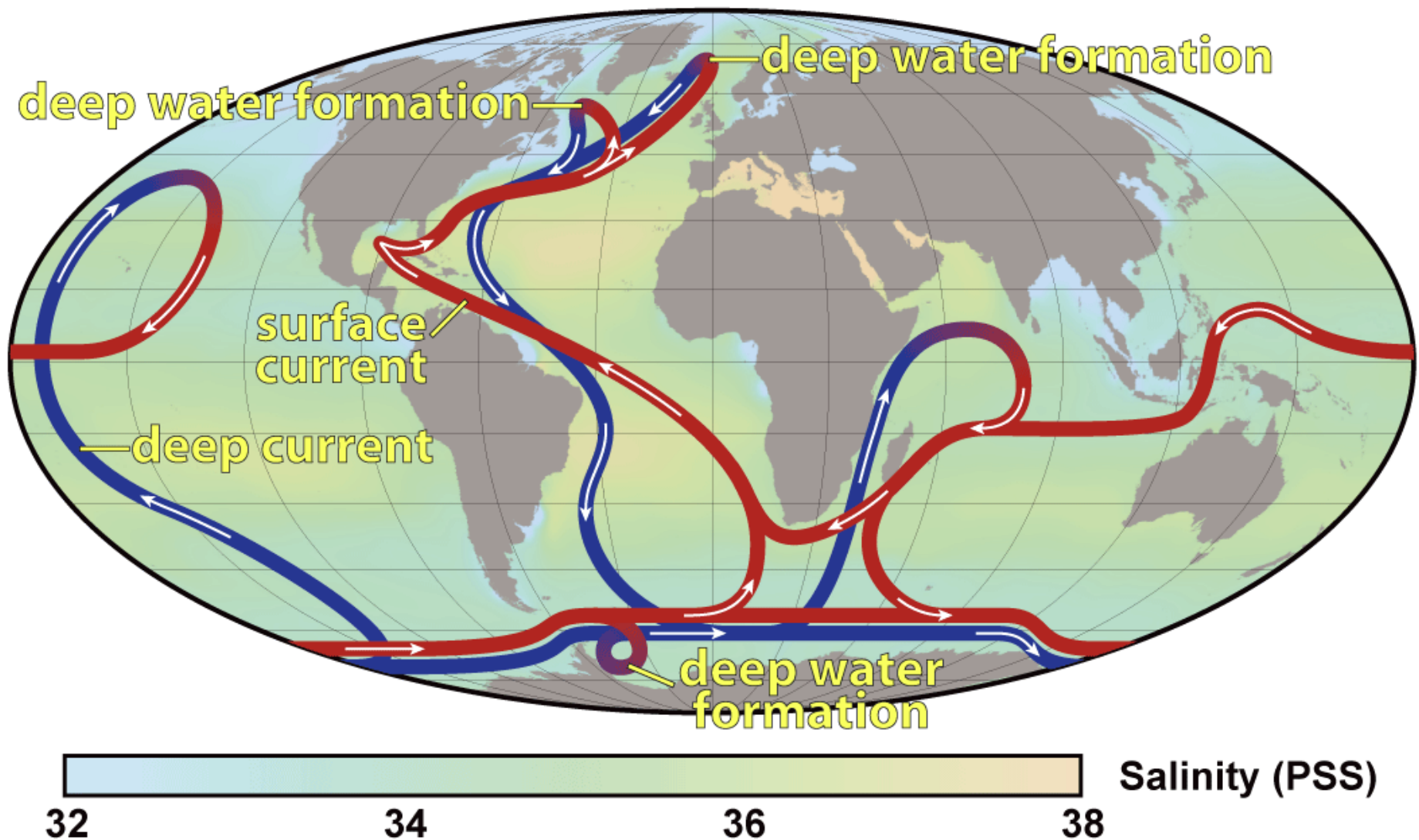
Per saperne di più su YouTube

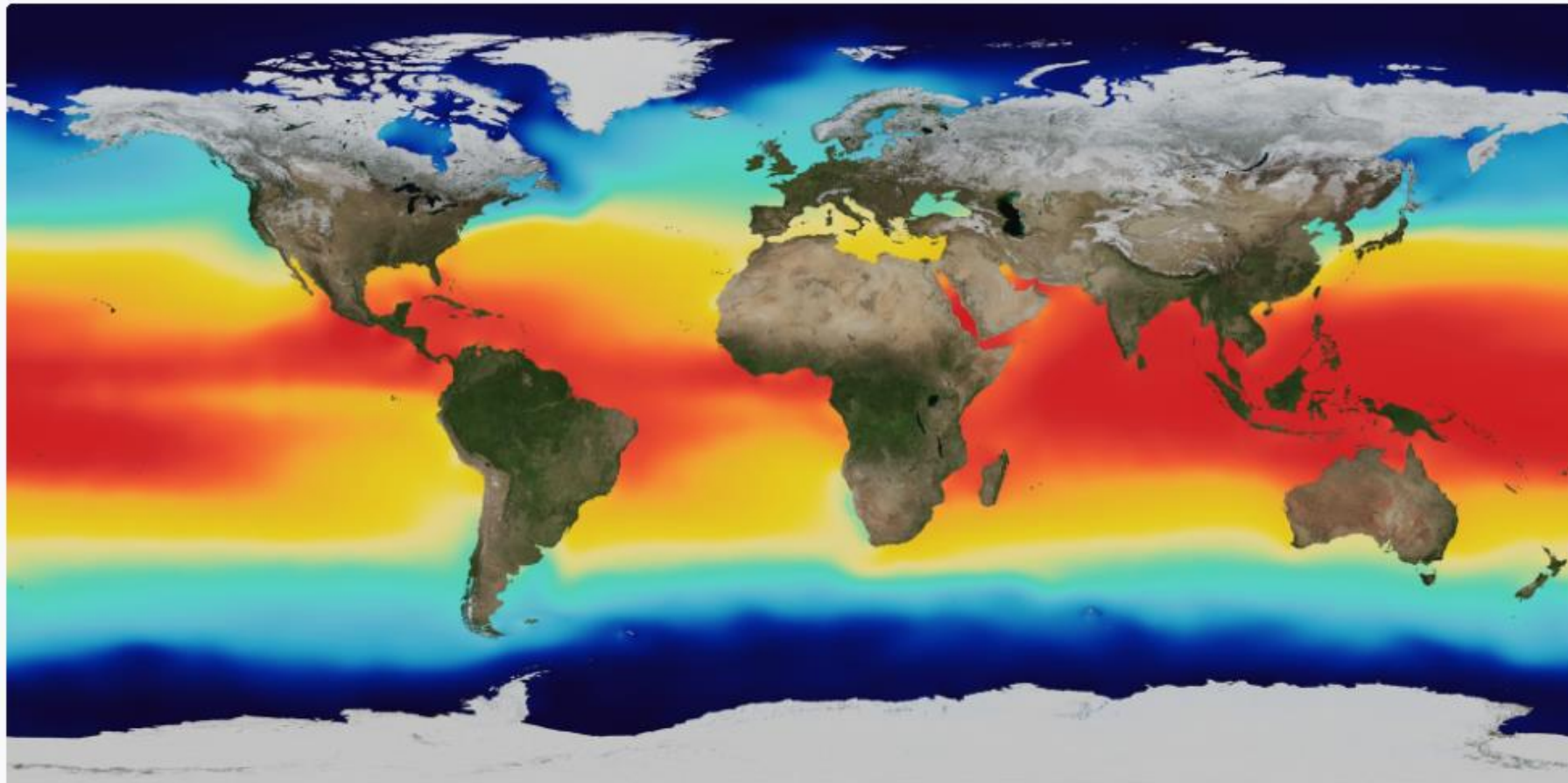
<https://www.youtube.com/watch?v=OJDjPAQtwFg>





Thermohaline Circulation





Global map of average Sea Surface Temperature (SST).



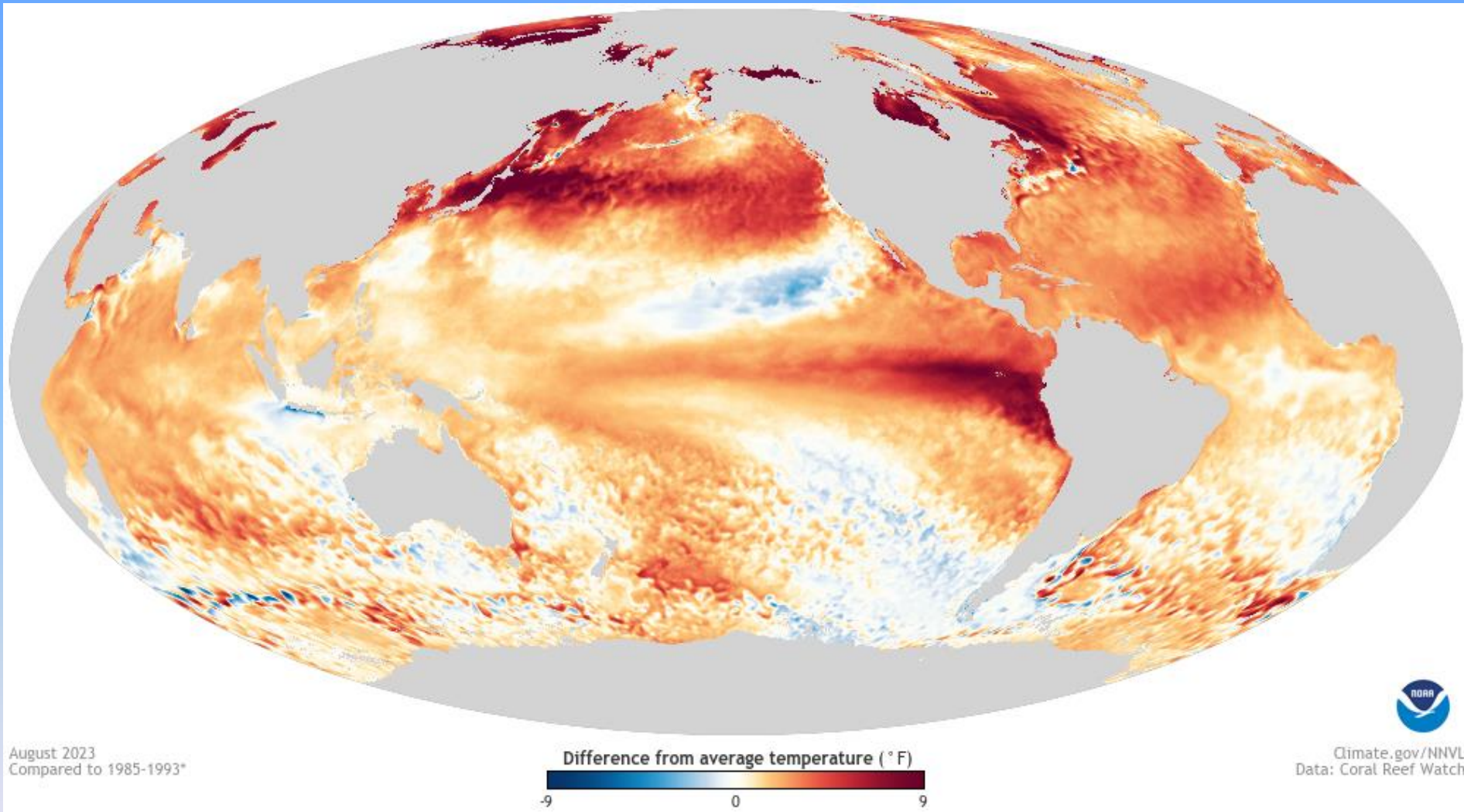
Download ▾

This [product](#) is available through our [Web Map Service](#).

Sea Surface Temperature



El Niño



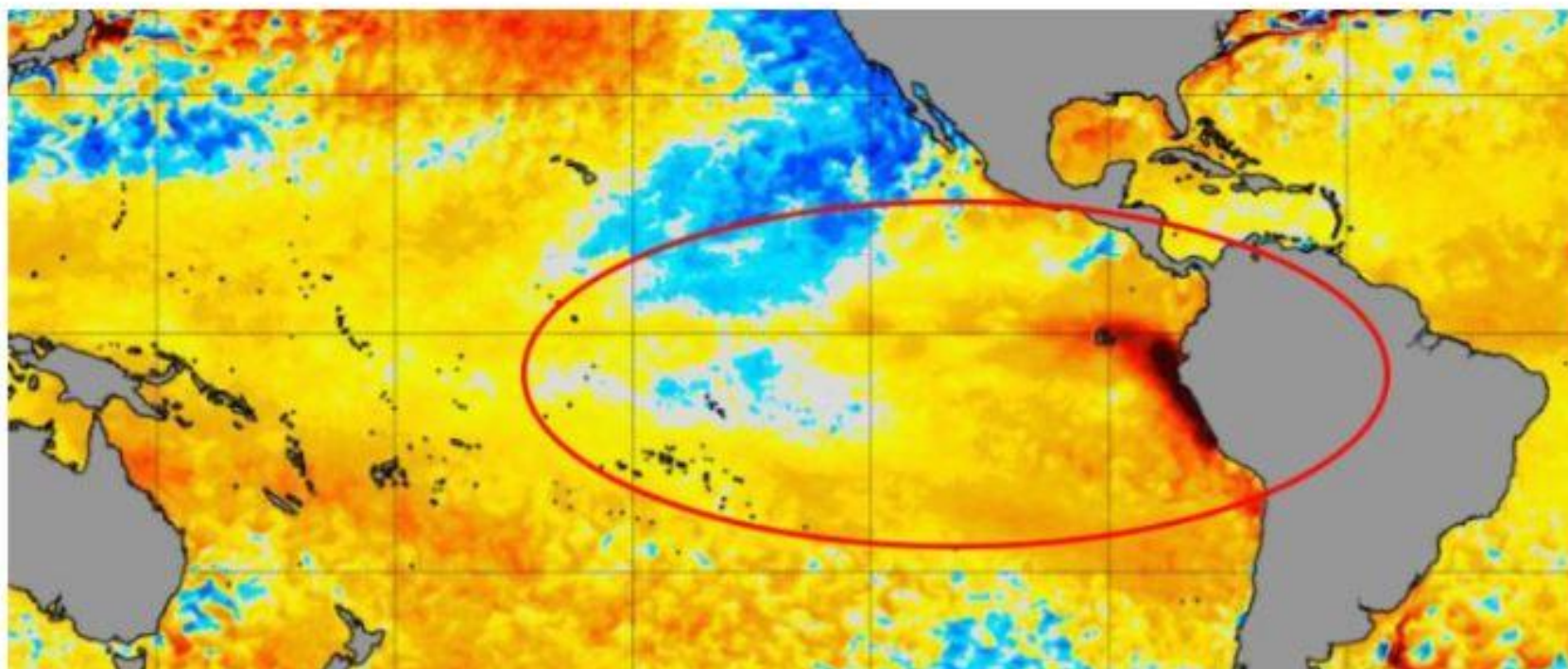
Notizie mondo

Primo piano

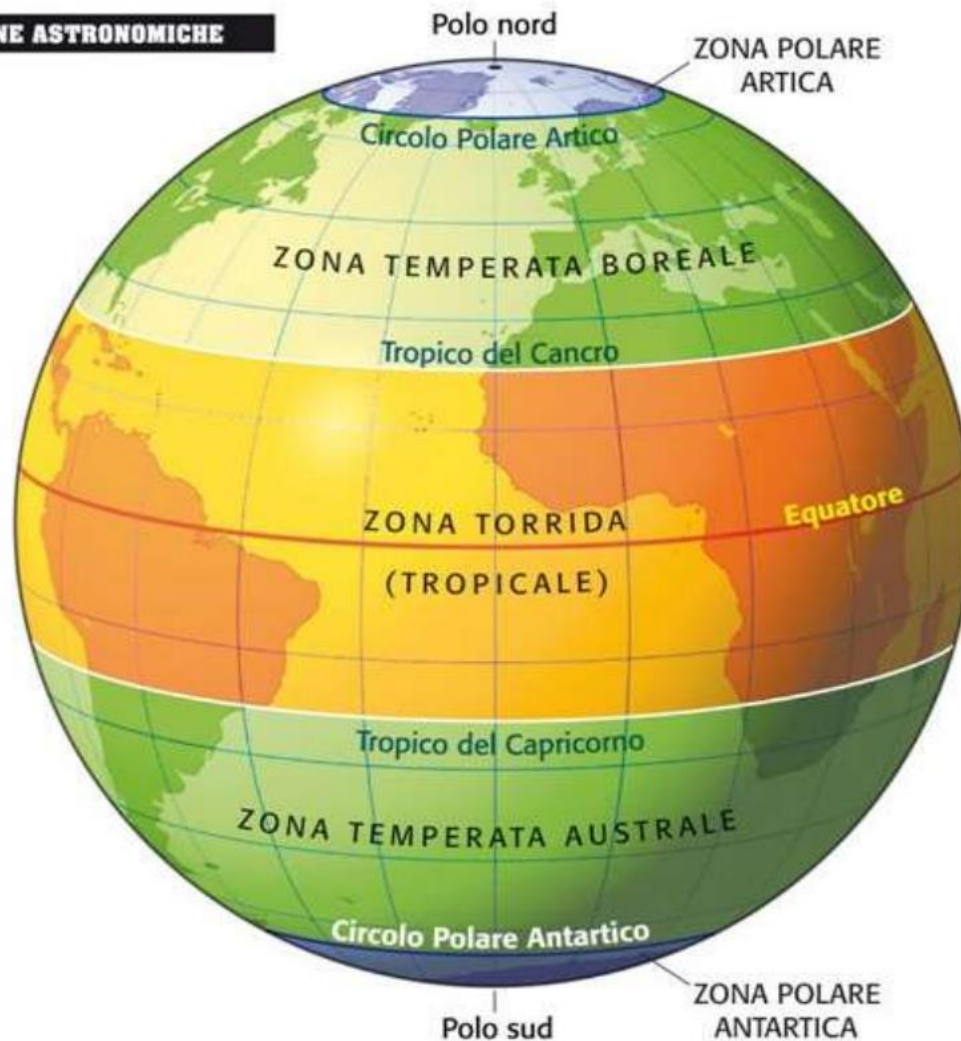
Possibile un "Super El Nino" entro la fine del 2023

Redazione • 15/04/2023 - 12:03

Un minuto di lettura

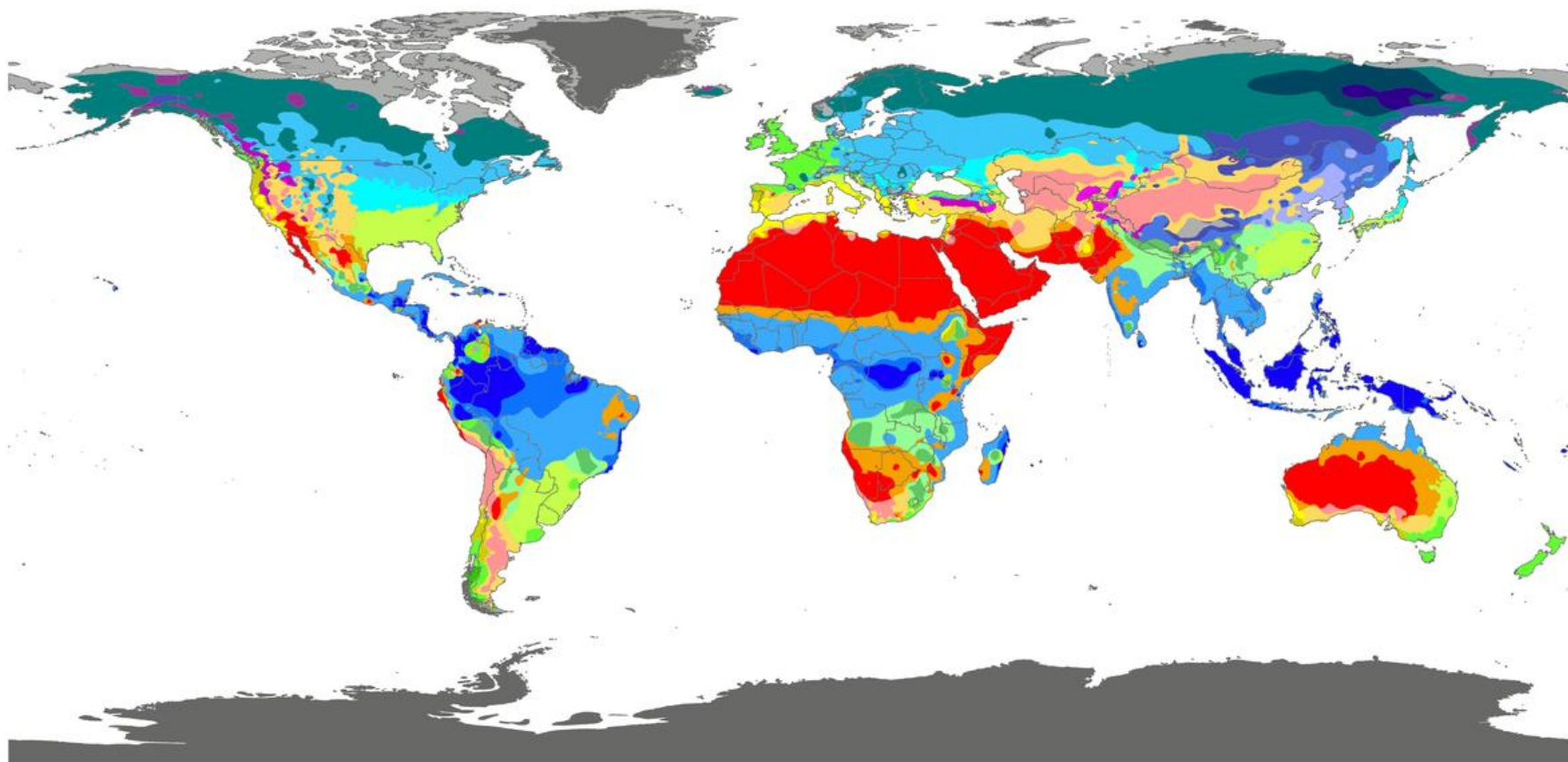


LE ZONE ASTRONOMICHE



LE FASCE CLIMATICHE TERRESTI: MACROCLIMI

Classificazione climatica mondiale secondo il sistema Köppen–Geiger



Af	BWh	Csa	Cwa	Cfa	Dsa	Dwa	Dfa	ET
Am	BWk	Csb	Cwb	Cfb	Dsb	Dwb	Dfb	EF
Aw	BSh		Cwc	Cfc	Dsc	Dwc	Dfc	
	BSk				Dsd	Dwd	Dfd	

FONTE: Stazione dati GHCN v.2.0
Temperatura (N=4,844) e
Precipitazioni (N=12,396)

PERIODO RILEVAZIONE: tutti i disponibili

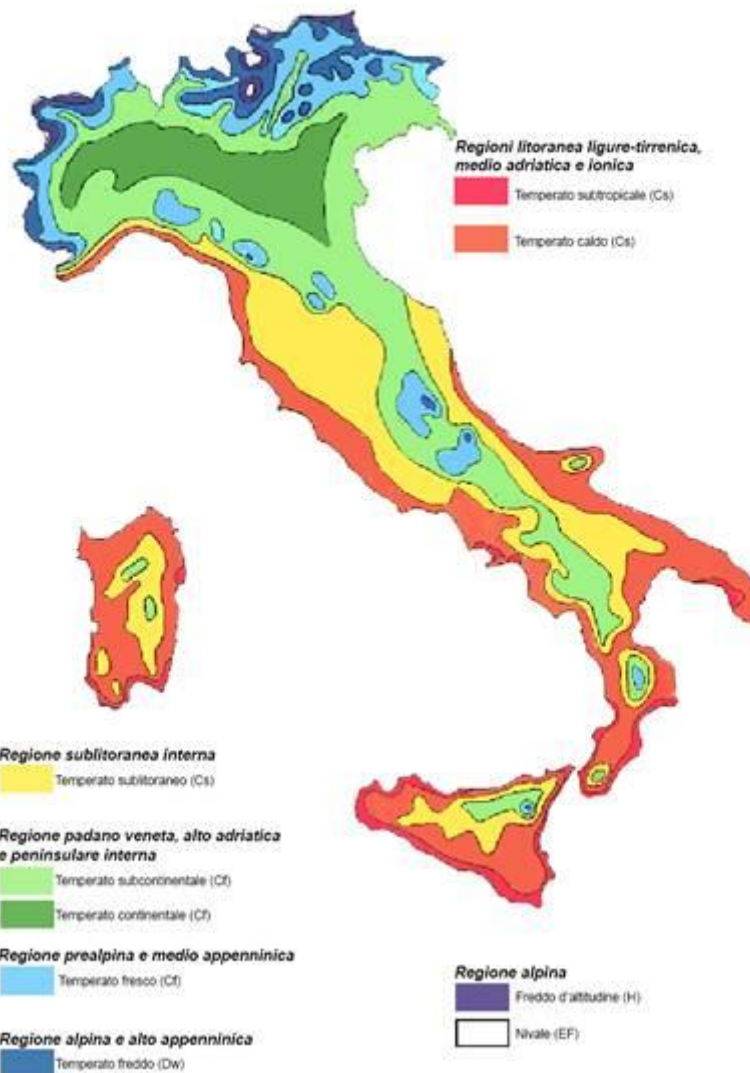
RILEVAZIONE MINIMA: 30 per ogni mese

RISOLUZIONE: 0.1 gradi lat/long

Contact : Murray C. Peel (mpeel@unimelb.edu.au) for further information



THE UNIVERSITY OF
MELBOURNE



abc NEWS

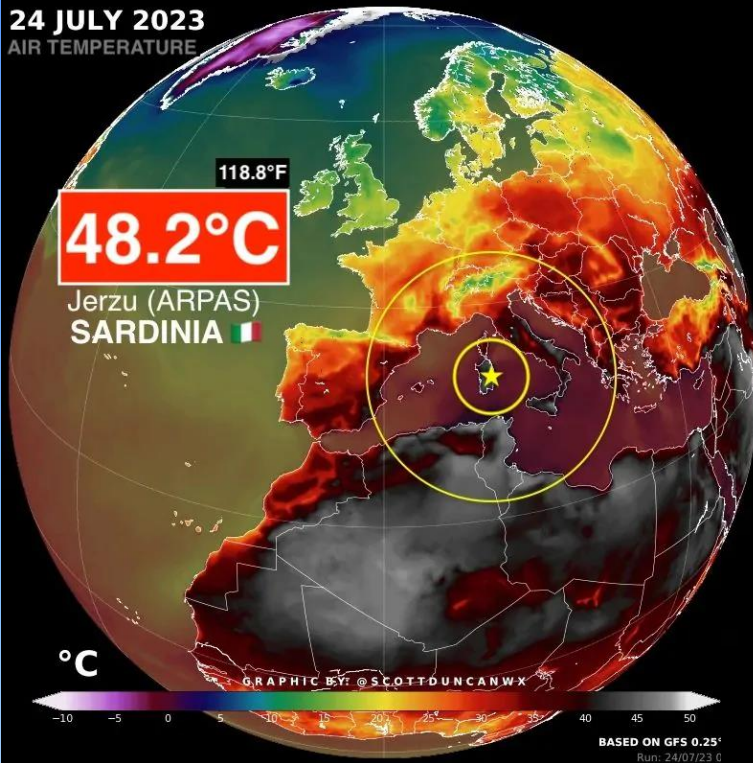
EARTH'S HOTTEST MONTH

JULY 2023

**JULY 2023 SET TO BE
HOTTEST MONTH ON RECORD**

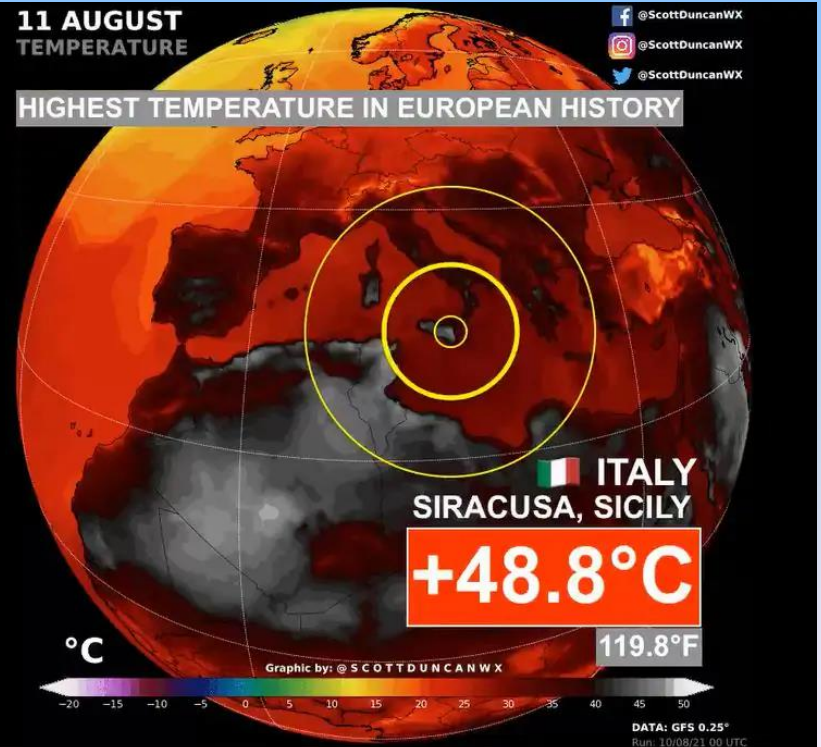
Climate Reanalyzer/Climate Change Institute

24 JULY 2023
AIR TEMPERATURE



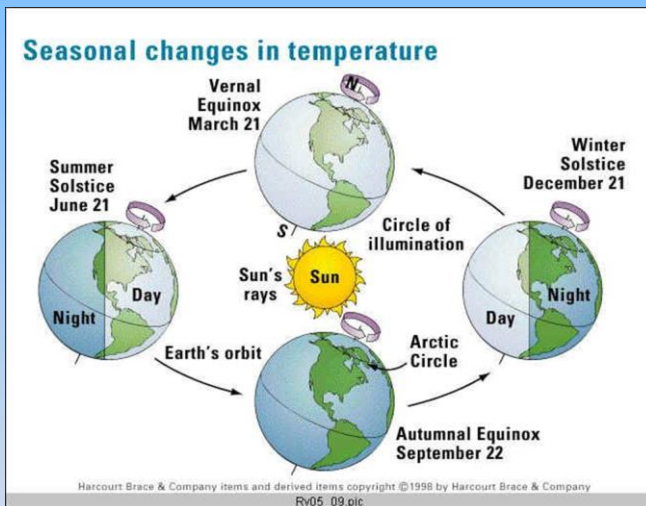
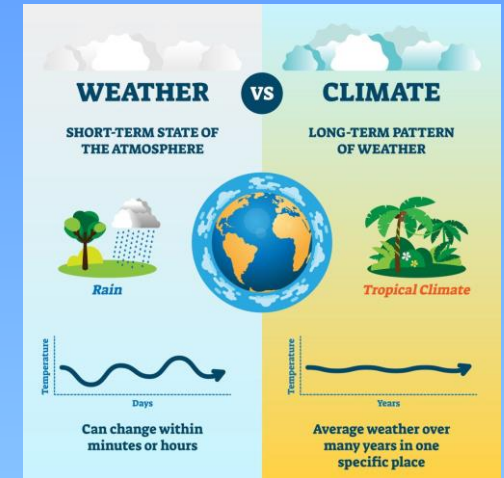
11 AUGUST
TEMPERATURE

HIGHEST TEMPERATURE IN EUROPEAN HISTORY



SINTESI

TEMPO – CLIMA METEOROLOGIA- CLIMATOLOGIA



L'ENERGIA DAL SOLE E LA CIRCOLAZIONE GENERALE

CLIMA E OCEANI

