The Amazon Connection: A Critical Factor in Climate Change: Saving the Forest for Sustainable Use

Sustainable World Conference

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What gives us our climate?

FLOWS OF ENERGY

Solar Input

Milankovitch Wobble

Albedo

Oxygen & Stratification of the Atmosphere

Greenhouse gases

Water Vapour

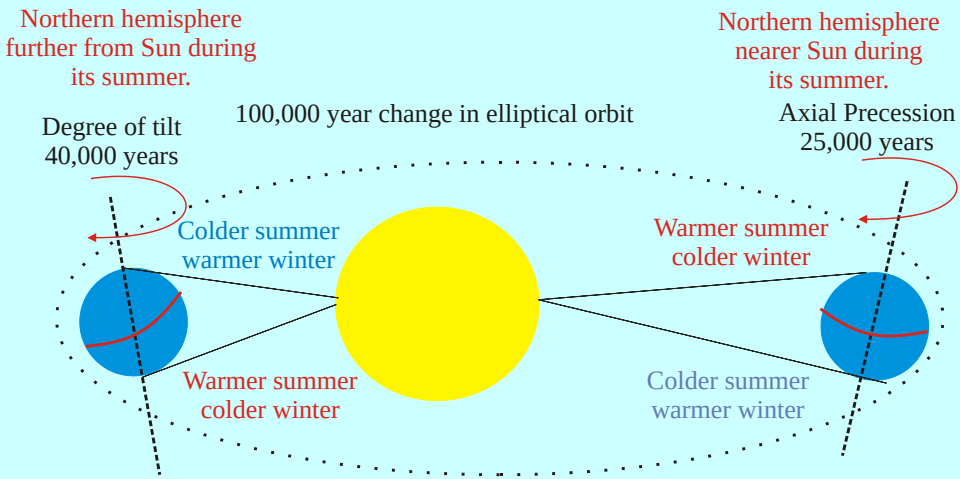
Air Mass Circulations

Ocean Circulation

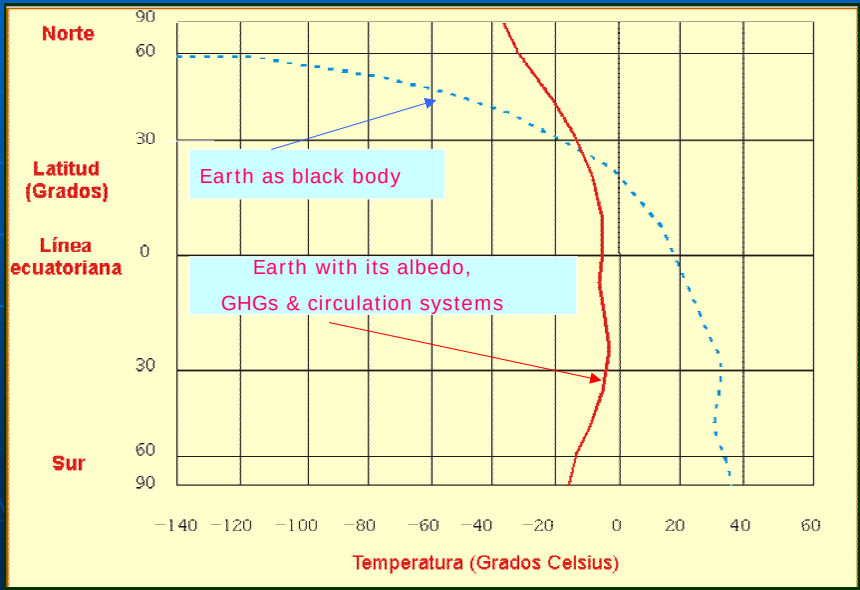
The Carbon Cycle

Earth's Orbit

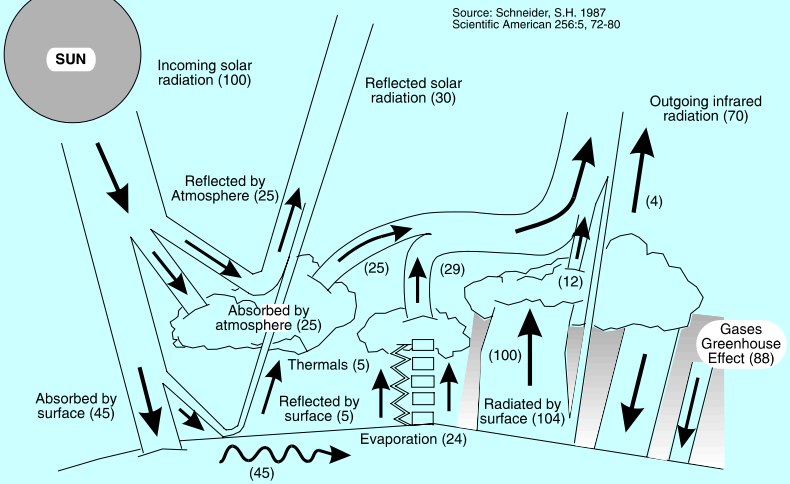
Factors leading to Seasons and Variations in Solar Input to Earth



Surface Temperature

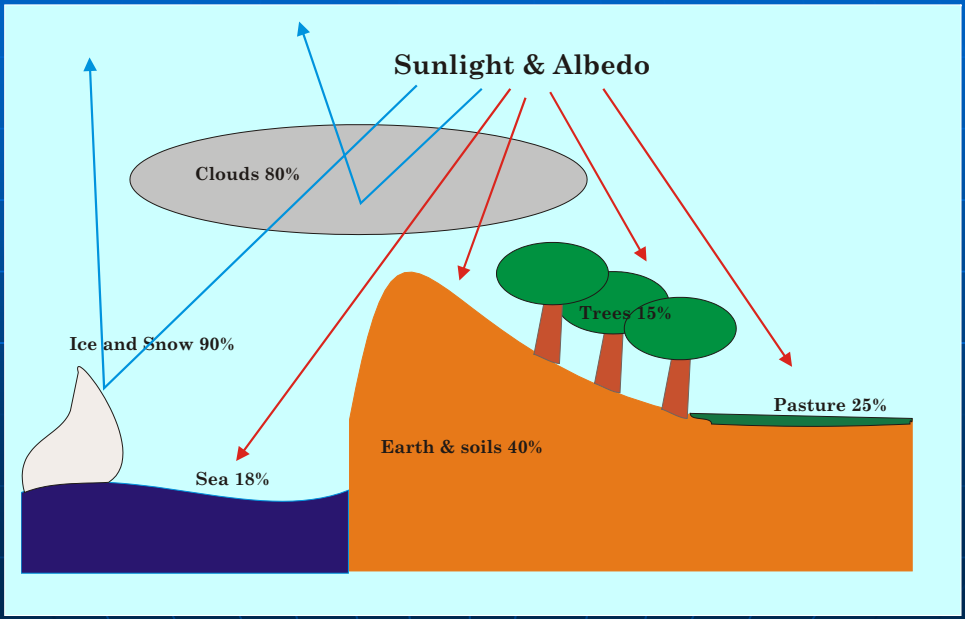


Energy Balance



The earth's radiation energy balance. The incoming radiation of 340 watts per sq. m is taken as 100 per cent. 88 per cent of the absorbed energy is re-directed to the earth's surface as a consequence of the greenhouse gases.

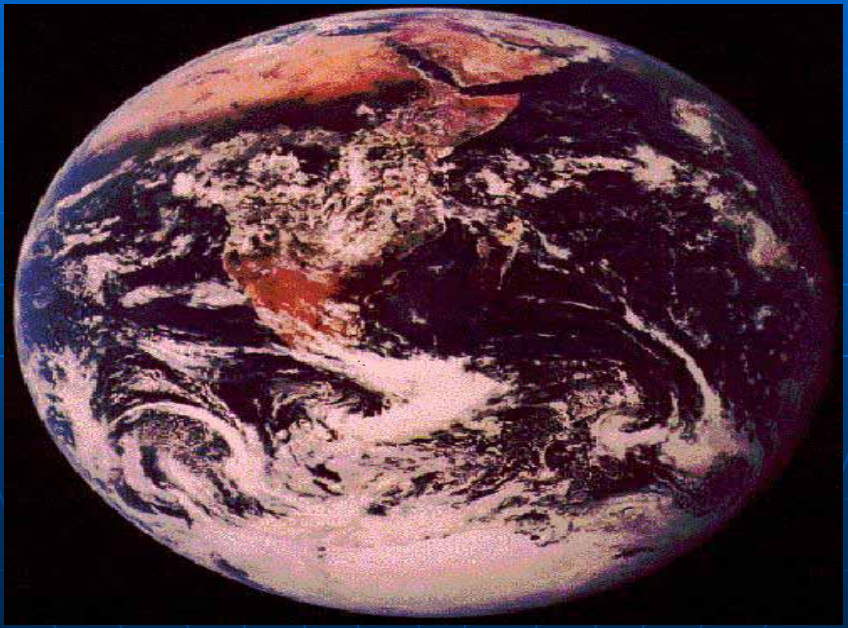
Albedo and Sunlight



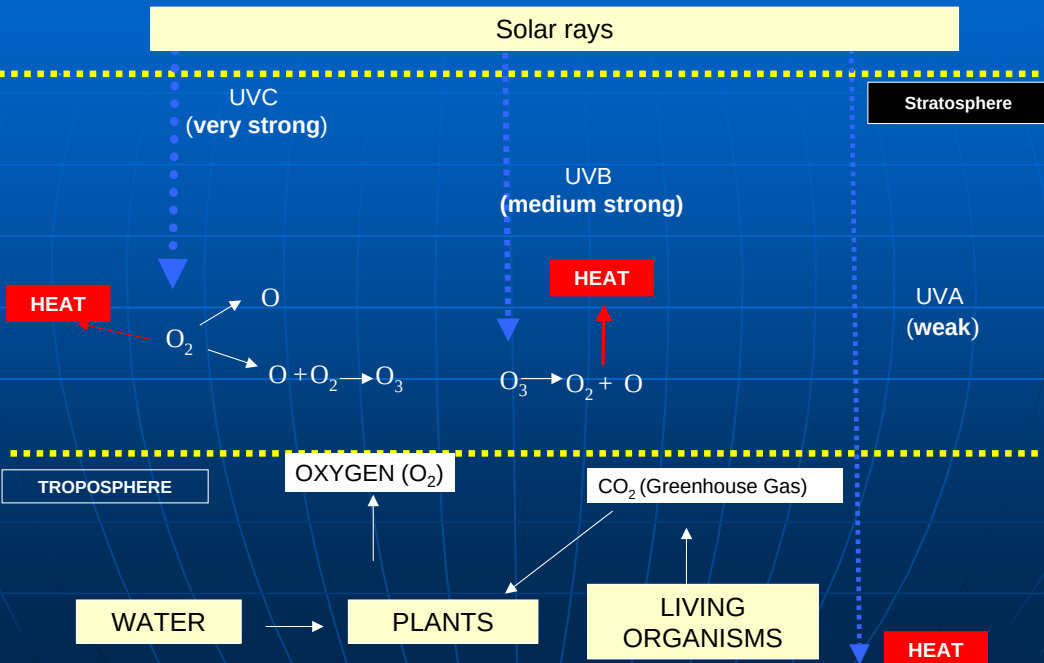
The Miracle of Our Planet

CHARACTERISTICS	EARTH	MARS	VENUS	EARTH WITHOUT LIFE
WATER	1,338,000,000 Km^3	5,000 Km^3	0	0 (approx.)
TEMPERATURE	18º C	-63º C	464º C	+200º C (approx.)
GASES				Aprox.
N_2	78.08 %	2.7 %	3 %	3 %
CO_2	<1 %	95.32%	96 %	95 %
O_2	20.95 %	0.13%	-	0.13 %
ATMOSFERIC PRESSURE	1	0.006	92	60

Clouds, Land & Sea

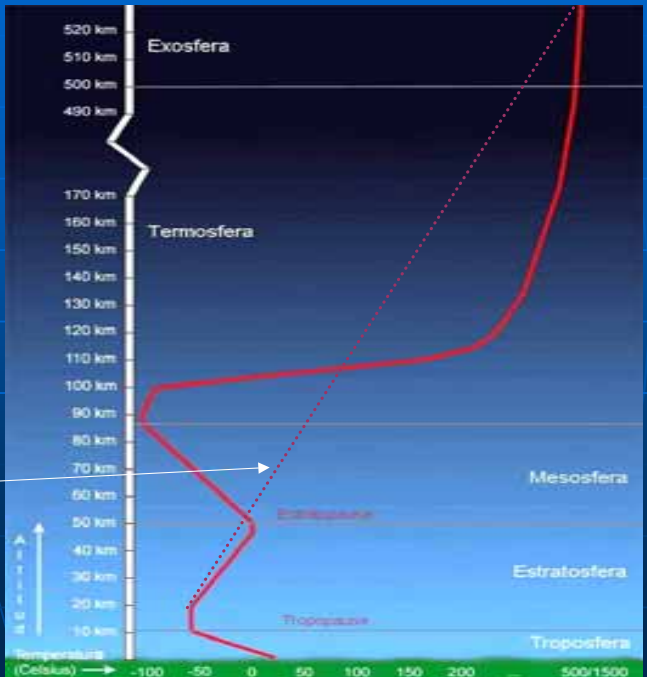


Essential Chemistry of the Stratosphere

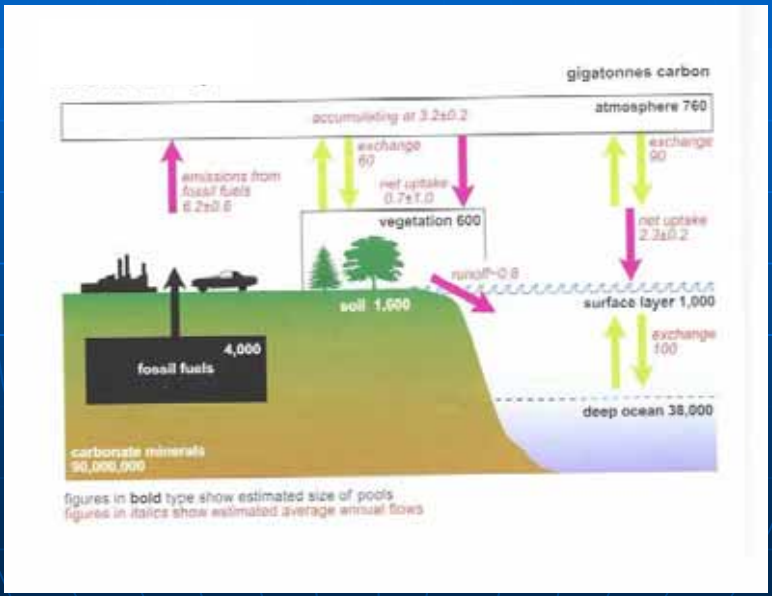


Stratification of the Atmosphere

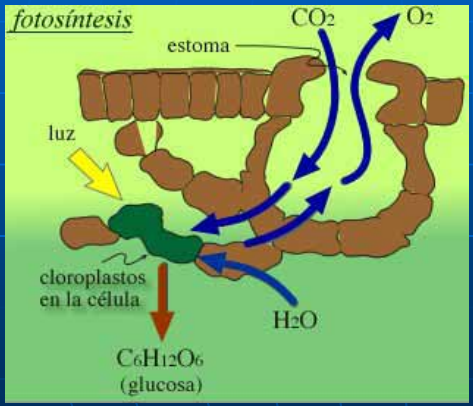
Without photosynthesis and the production of oxygen the atmosphere would not be comfortable for terrestrial life.

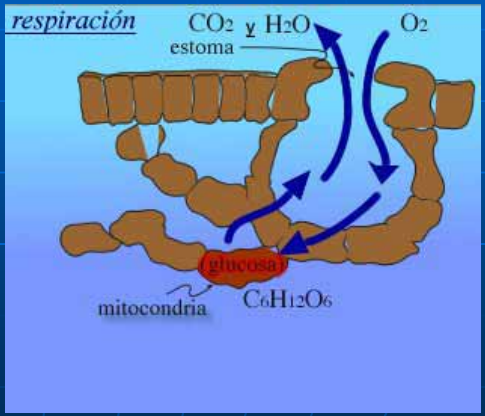


Global Carbon Cycle

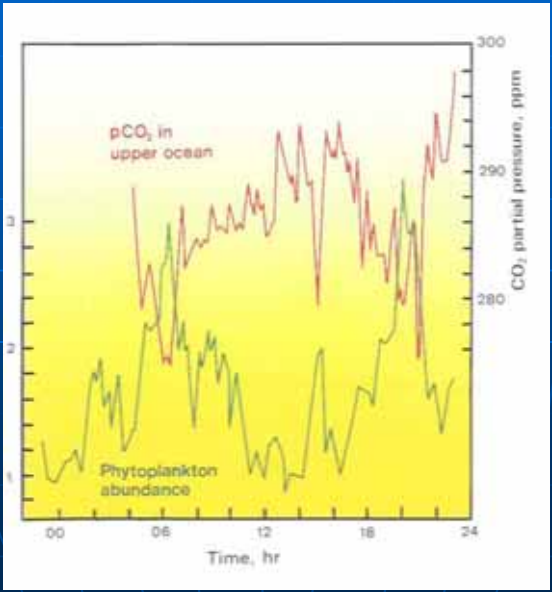


PHOTOSYNTHESIS vs RESPIRATION

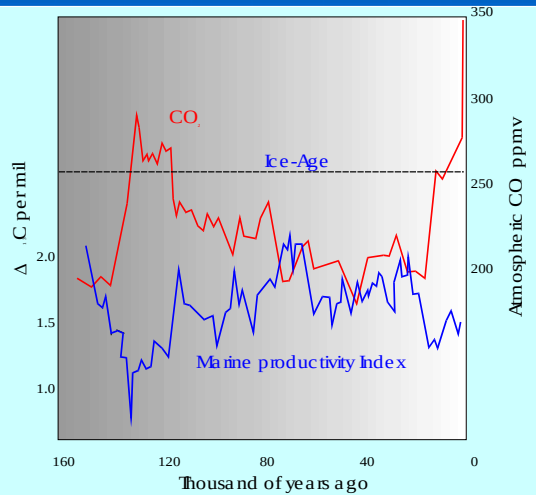




Plankton & CO_2

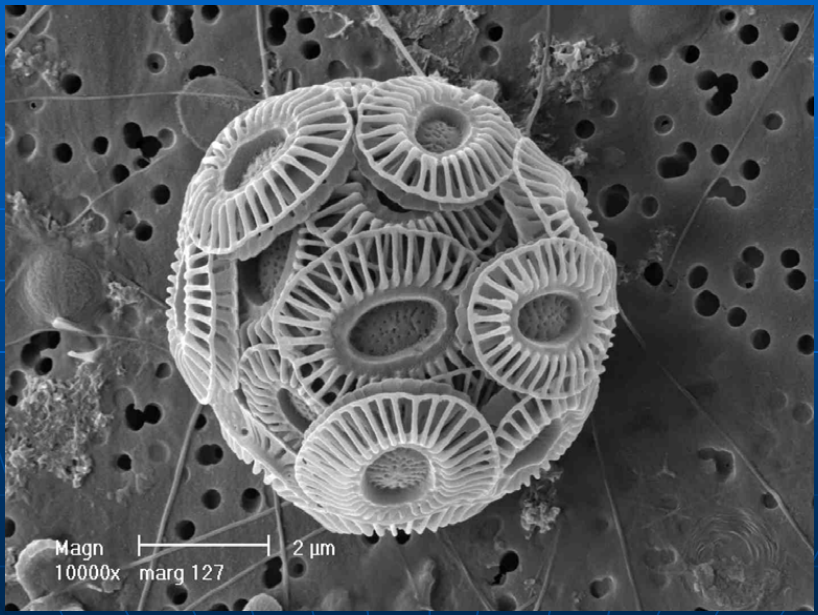


History of Ocean CO_2



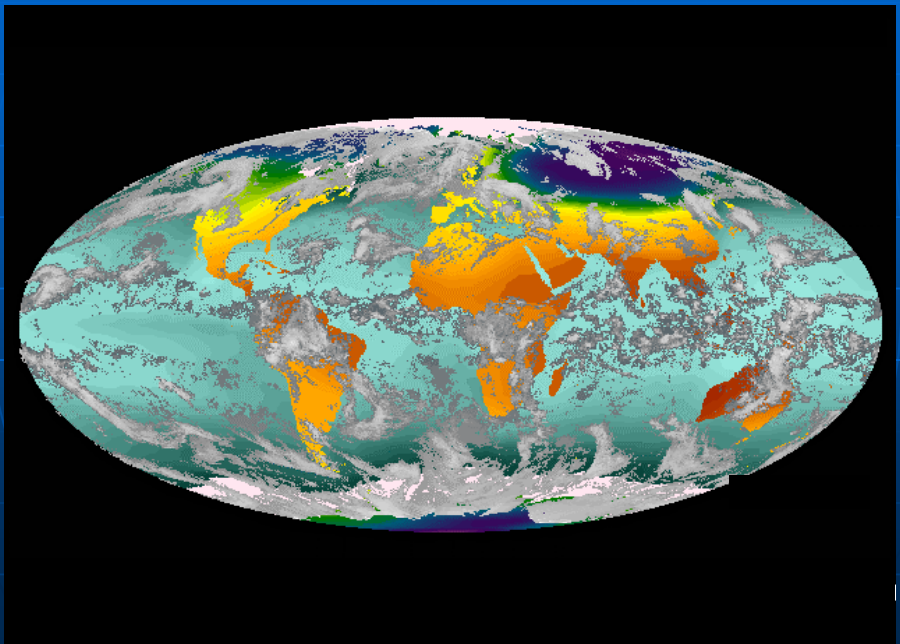
Changes in atmospheric carbon dioxide over the past 160,000 years are closely correlated, an inverse relationship, with carbon isotope indicators of plankton productivity. Notice the lag in the correlation at time zero.

Emiliania huxleyi



COCCOLITHOPHORE BLOOM

RELATION BETWEEN THE AMAZON BASIN AND AFRICA

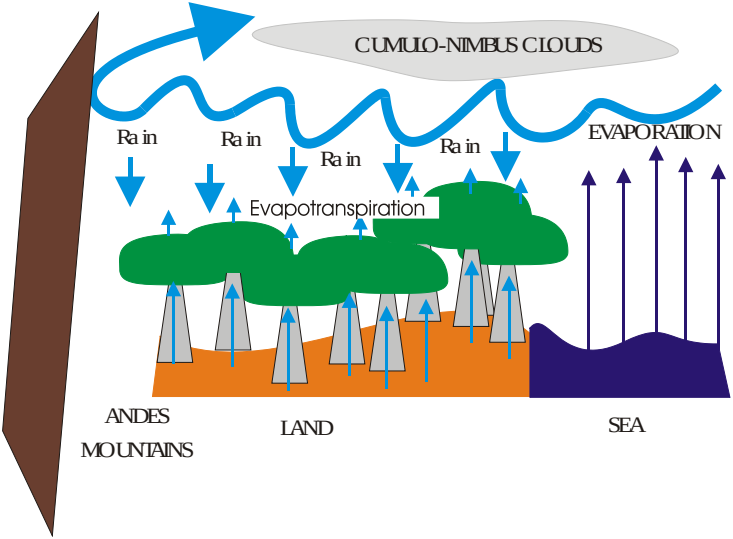


Vue sur la forêt amazonienne. Une diminution de la pluviosité sur l'Amazonie liée au réchauffement serait fatale pour la forêt tropicale et pour le climat de la pla

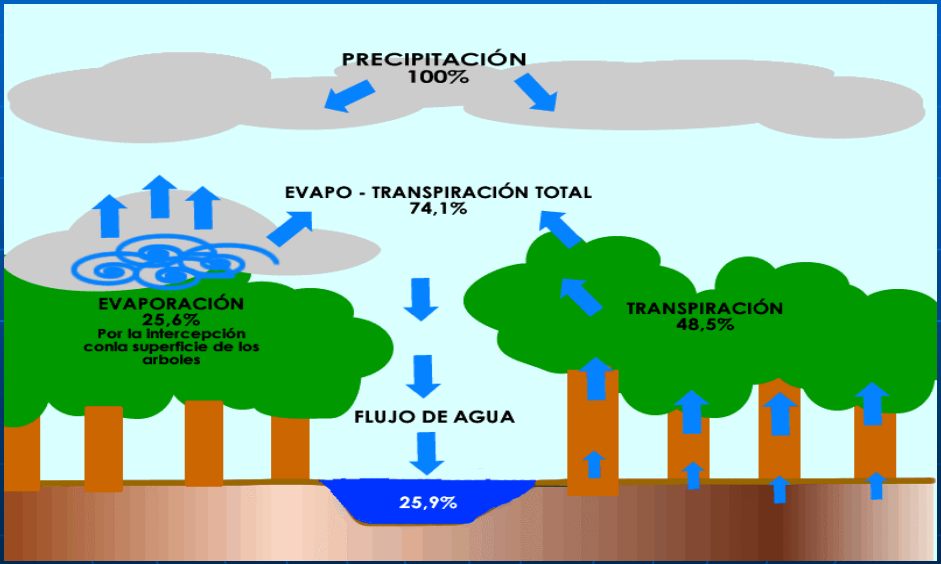
Effet de serre : vers l'emballement

Si la forêt amazonienne venait à disparaître à cause du réchauffement et de la déforestation, la planète se verrait privé d'un régulateur climatique essentiel. **Peter Bunyard** et **Xavier Brault** examinent les conséquences d'un emballeme climatique et proposent les moyens de la prévenir.

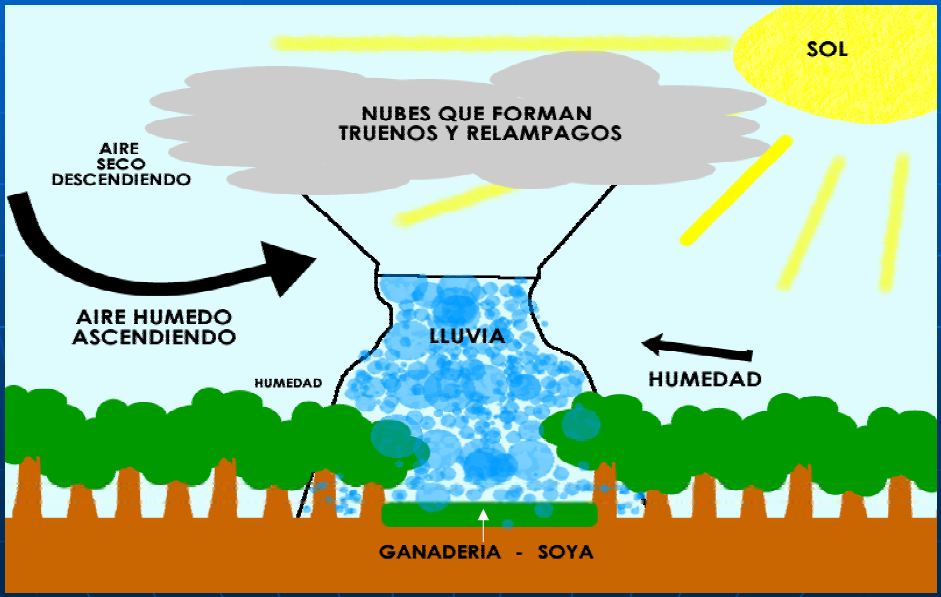
RECYCLING OF RAIN IN AMAZONIA



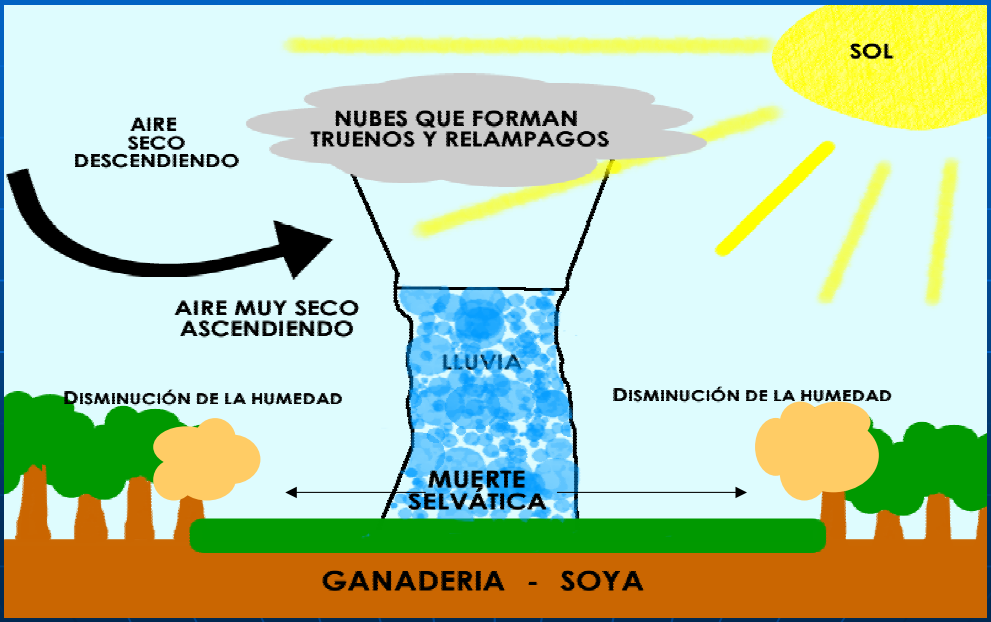
WATER RECYCLING IN THE AMAZON



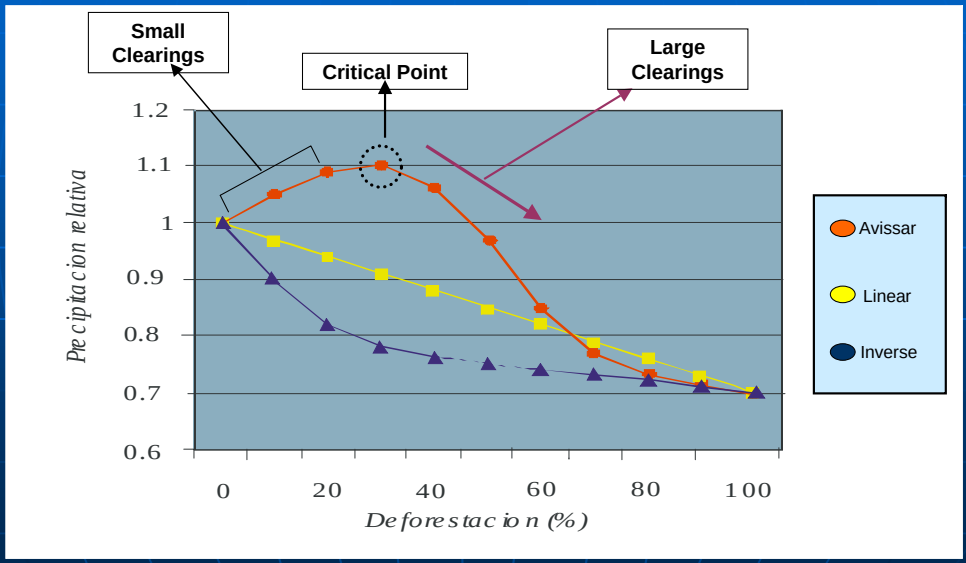
SMALL CLEARINGS AND RAINFALL



LARGE CLEARINGS & RAINFALL

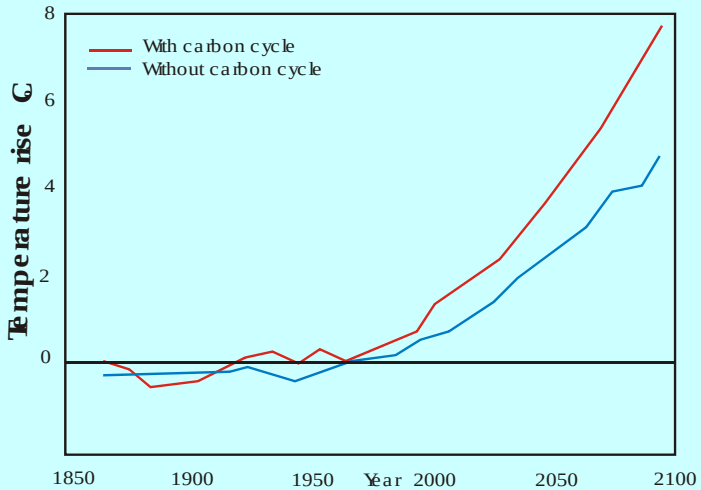


IMPACT OF DEFORESTATION ON RAINFALL



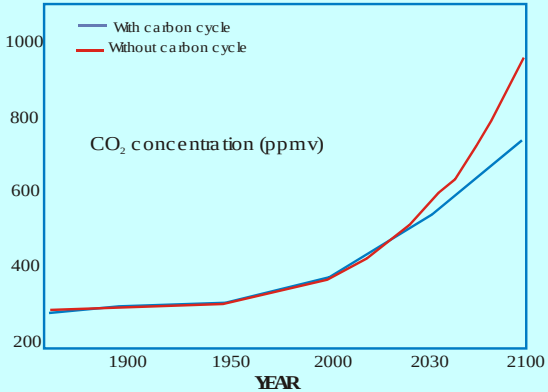
Roni Avissar et al. 2002

Impact of Carbon Cycle



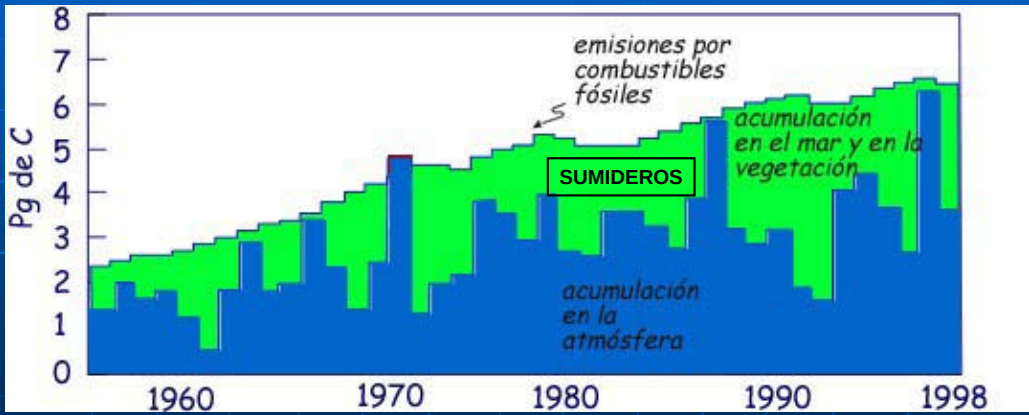
Simulated global mean temperature rise over land with and without carbon-cycle feedback

CO_2 and Vegetation

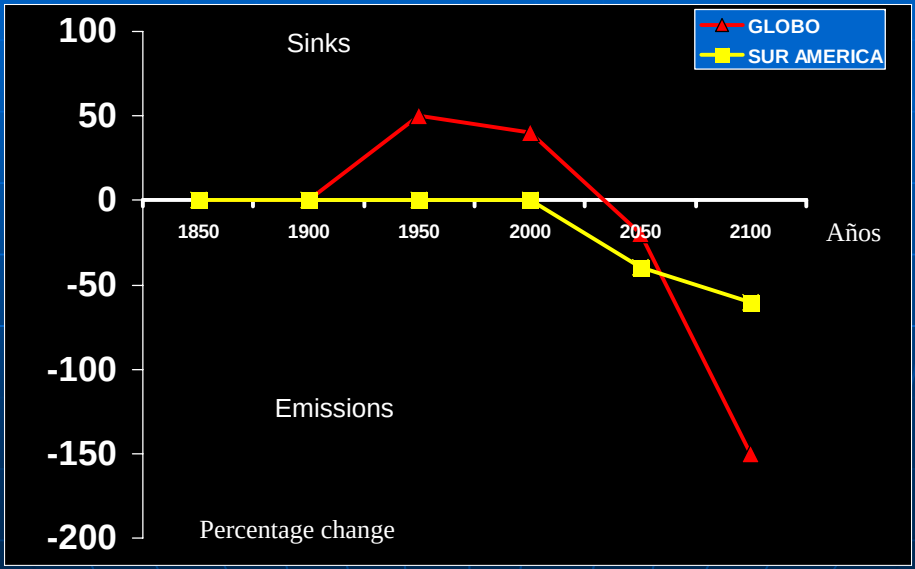


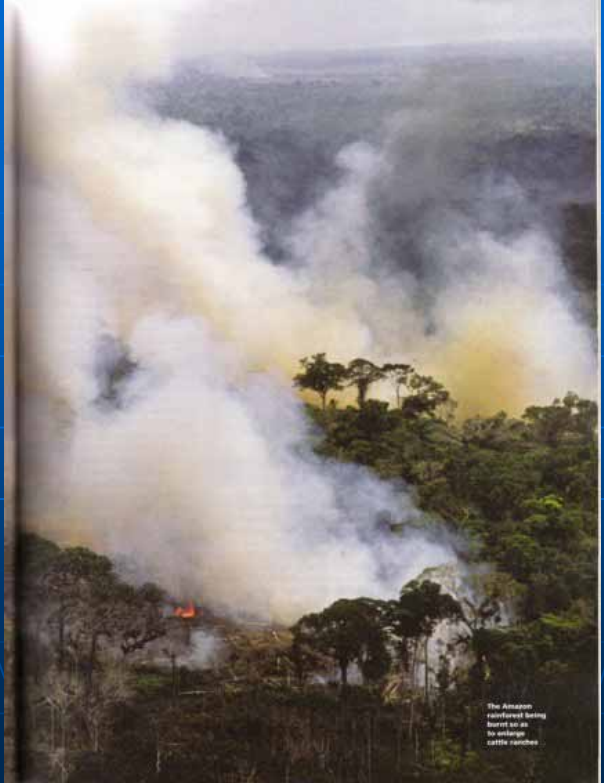
Simulated atmospheric concentrations (parts per million by volume) of carbon dioxide when the two-way interaction between climate and the carbon cycle is included. For comparison the results obtained when climate is not allowed to feed back onto the carbon cycle are also shown. Prior to 1990, historical emissions were used. Beyond 1990, emissions followed those in the IPCC IS92a scenario.

CO_2 SOURCES & SINKS



CARBON LOSS THROUGH GLOBAL WARMING





The Amazon rainforest being burnt so as to enlarge cattle ranches

Soya & Destruction

26,000 km^2 in 2004

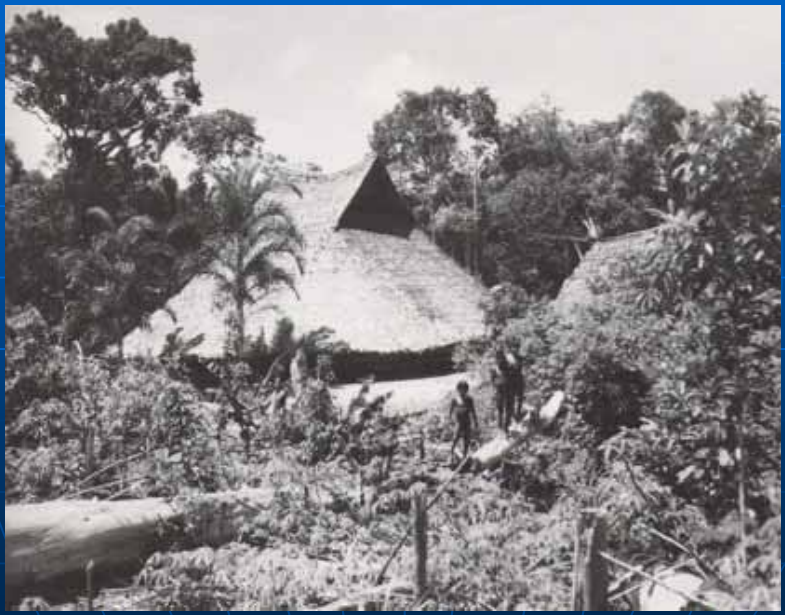
This year's destruction means that more than 17 per cent of the Amazon has been flattened, but disorganisation, apathy and pressure on the economy are jeopardising efforts to protect it

Aerial view of advancing deforestation in the Amazon Basin

Tatuyo Longhouse: Río Piraparaná, Vaupés, Colombia (photo Dick Schultes, 1940's)

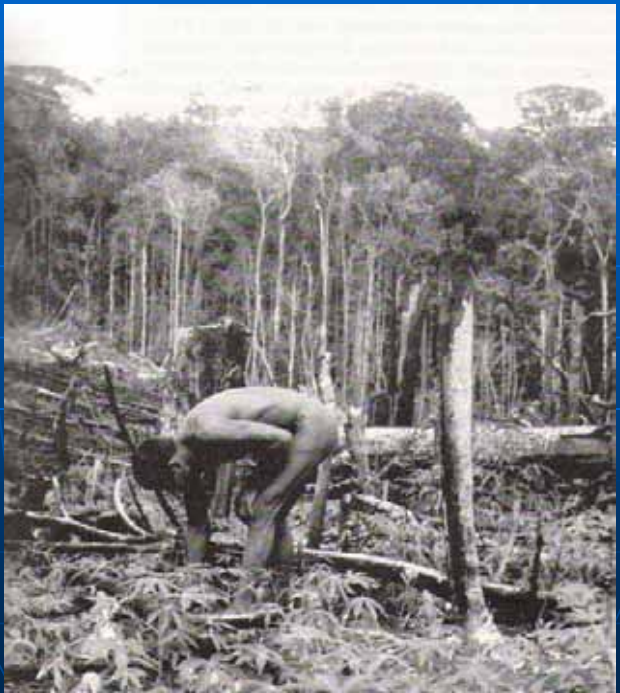
Makuna Roundhouse, Miritiparaná, Colombia

(Richard Schultes, 1940's)



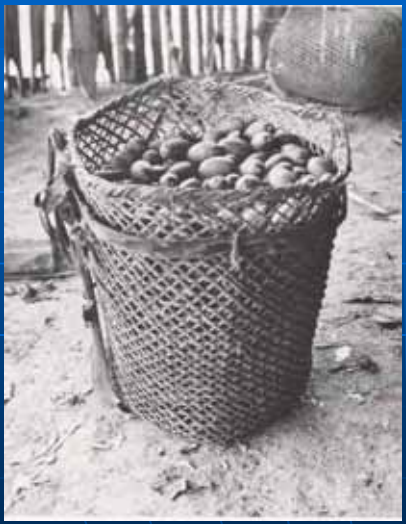
Tatuyo Garden, Vaupés, Colombia

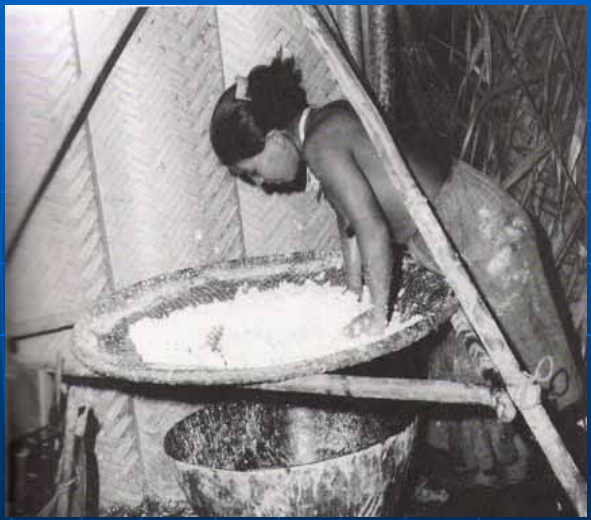
(Reichel-Dolmatoff, 1960's)



Palm Nuts and Sieving Manioca (Yuca brava)
Colombian Amazon

(Reichel-Dolmatoff, 1960's)





The Orchard: this area covers some 2 to 3 hectares around the maloca.

Nearby forest: includes the forested area around the maloca from which essential materials and plants are obtained. Some 168 different plant species are used.

Distant forest: this region of forest, encompassing some 10,000 hectares, is essential for hunting and for obtaining plant materials.

Nearby lake: three small lakes, taking up some 60 hectares are used for fishing during the summer months when the waters are low.

Cananguchales: these are areas which are permanently or seasonally flooded and are important for the tree species canangucho *(Mauritia flexuosa)* which has a nutritious fruit and attracts game.

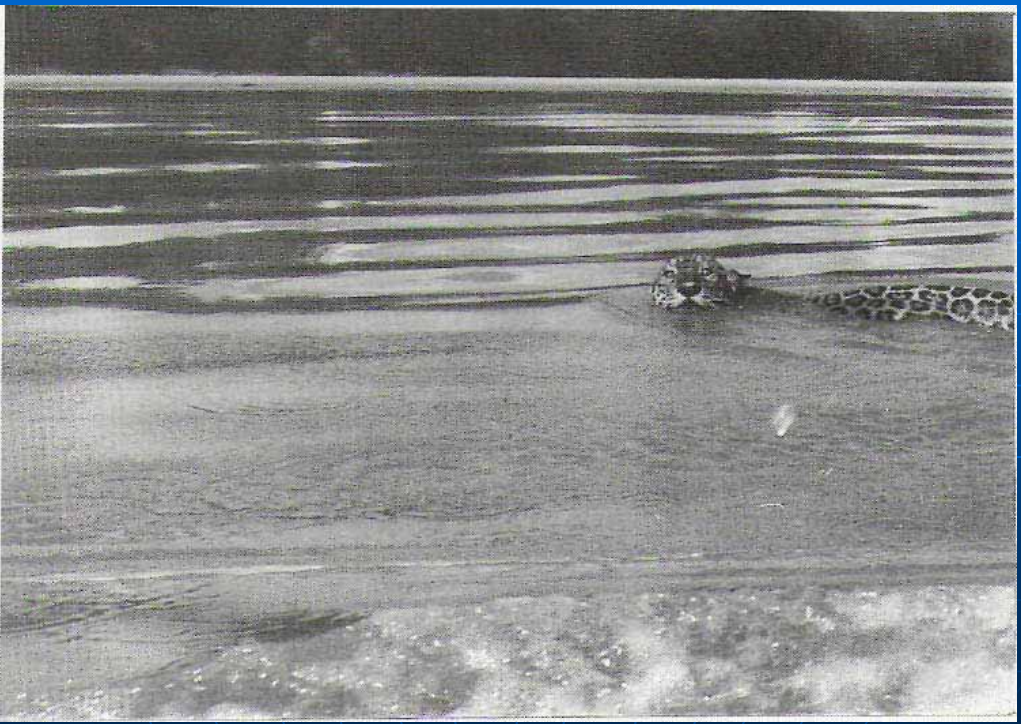
Chagras: the Yucuna settlement, including the area destined for chagras, was in 100 hectares of forest in various stages of regeneration. The chagras are usually one to two hectares in size.

Rastrojos - secondary growth: some 40 abandoned chagras were to be found in different stages of regeneration following the settlement some 16 years before.

Flood plains, near and far: provide fish during the months of high waters and hunting when the waters fall.

Rivers, near and far: can be used for fishing during the dry seasons when the waters fall.

Salados - the salt licks: such areas attract game such as tapir and deer.



Experiment in Forest Regeneration using *Inga Edulis*

Mike Hands, Honduras

Sarah Bennett with an orphaned woolly monkey in Colombia's National Park beside the Amazon River.

CHANGES IN GLOBAL TEMPERATURE