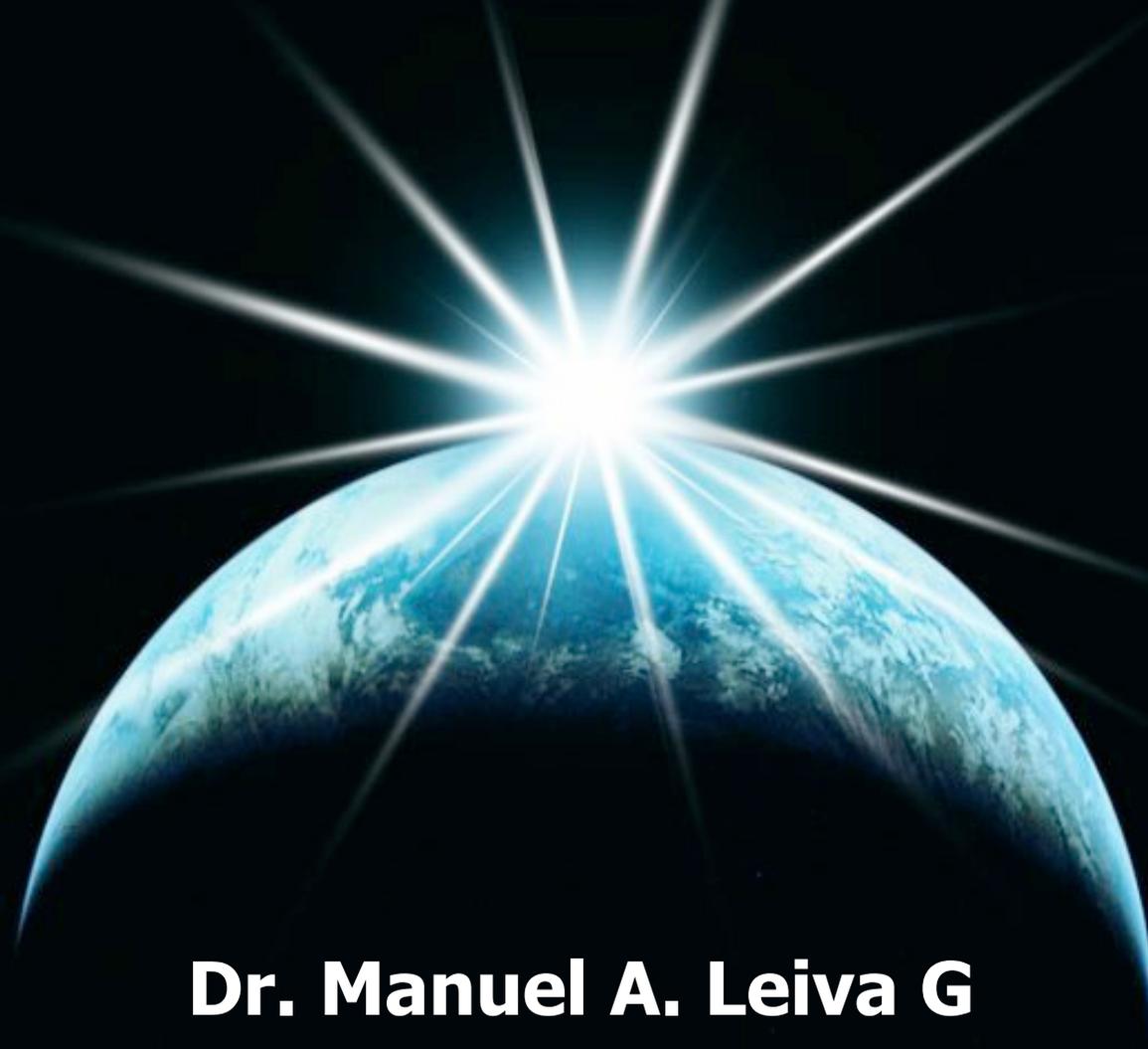


SISTEMA TIERRA



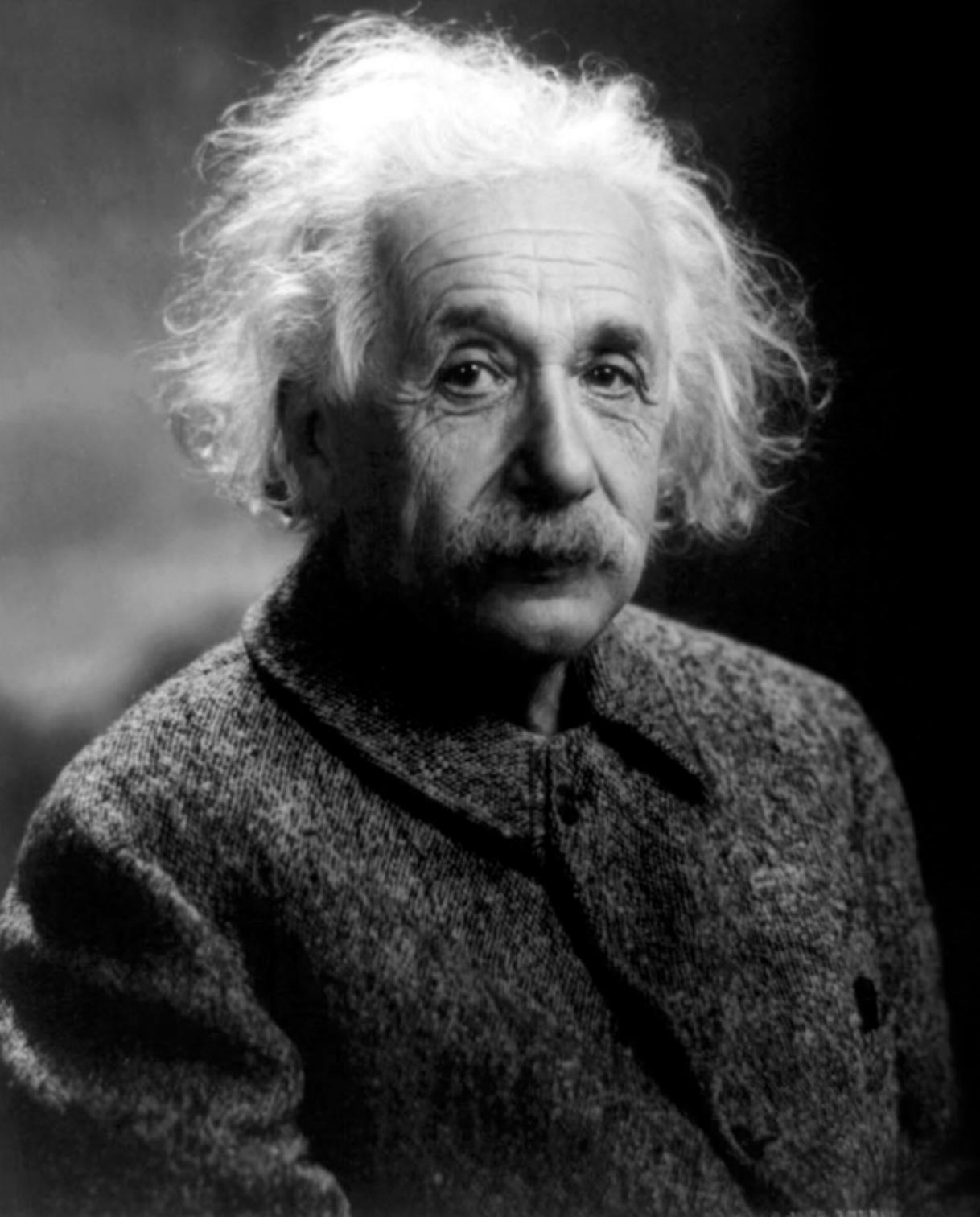
Dr. Manuel A. Leiva G



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manleiva@uchile.cl
manleiva@me.com



*"Es mas fácil
desintegrar un átomo
que un prejuicio"*

Albert Einstein



¿Vamos a armar un puzzle?

Esferas



Globalization's Impact on Air Environment in Santiago, Water Environment in Osaka, and Soil Environment in Shanghai, Leiva, M.A., Sei, K., Soda, S., Yanai, J., Chen, A., 2004. APRU Special Paper. Association of Pacific Rim Universities, Singapore, pp. 6–24. Available on line http://www.apru.org/activities/afp/collab_paper.htm.

HIDRO



Cambio Climático

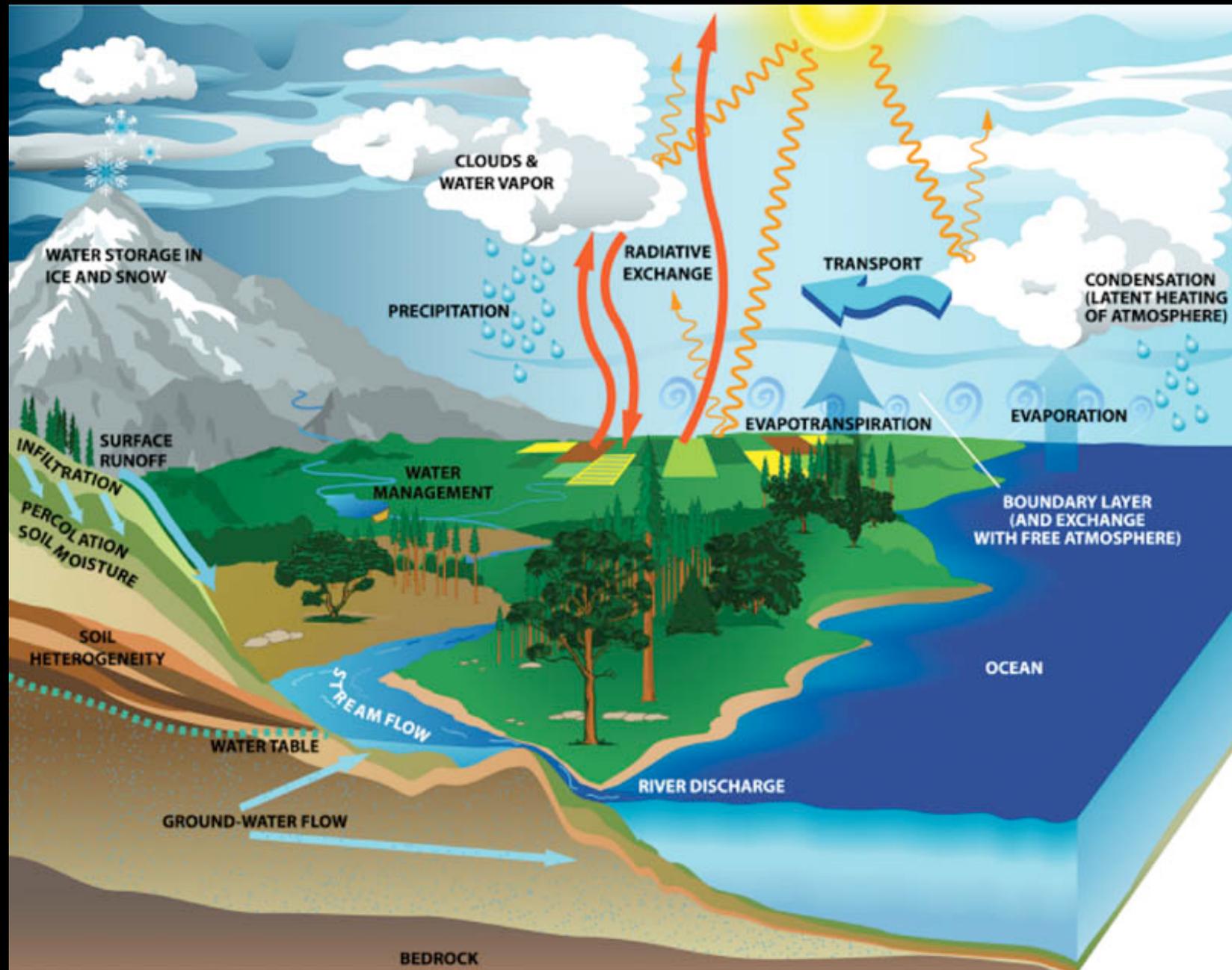
Uso del Agua

Calidad de Agua

Conflictos

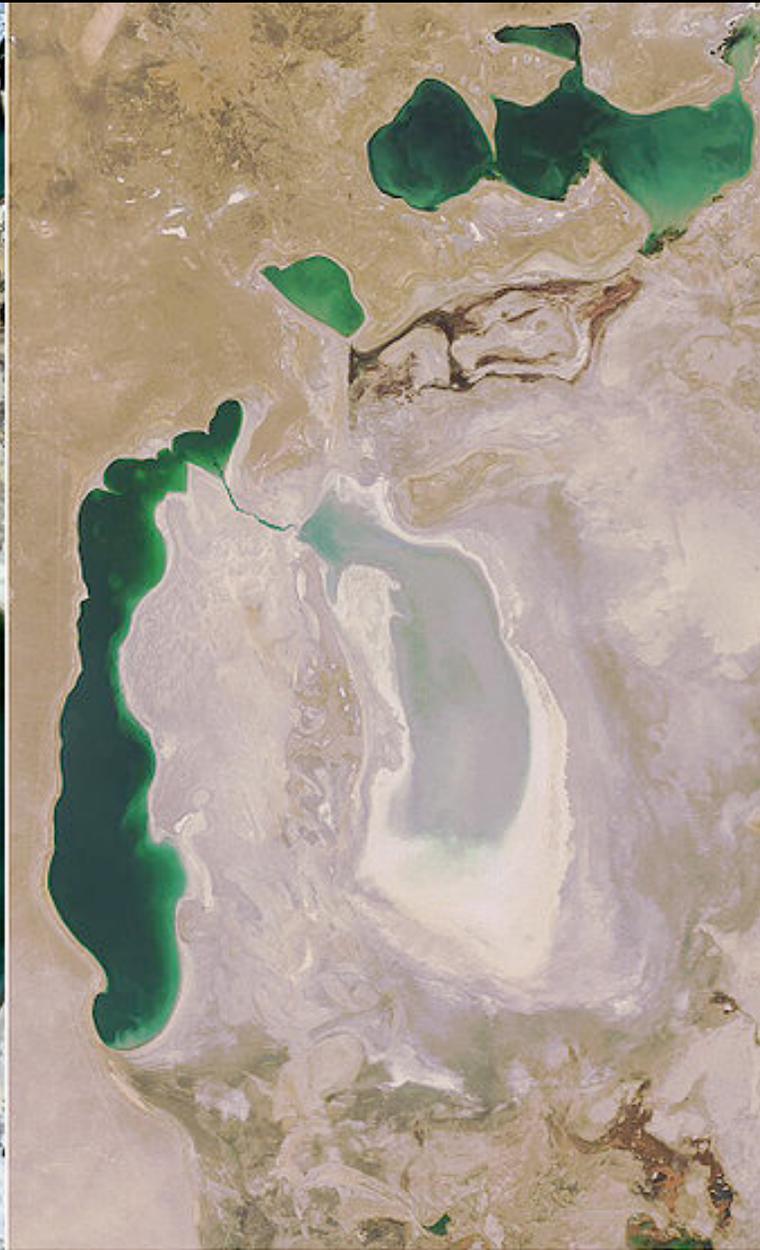
Lluvia Acida







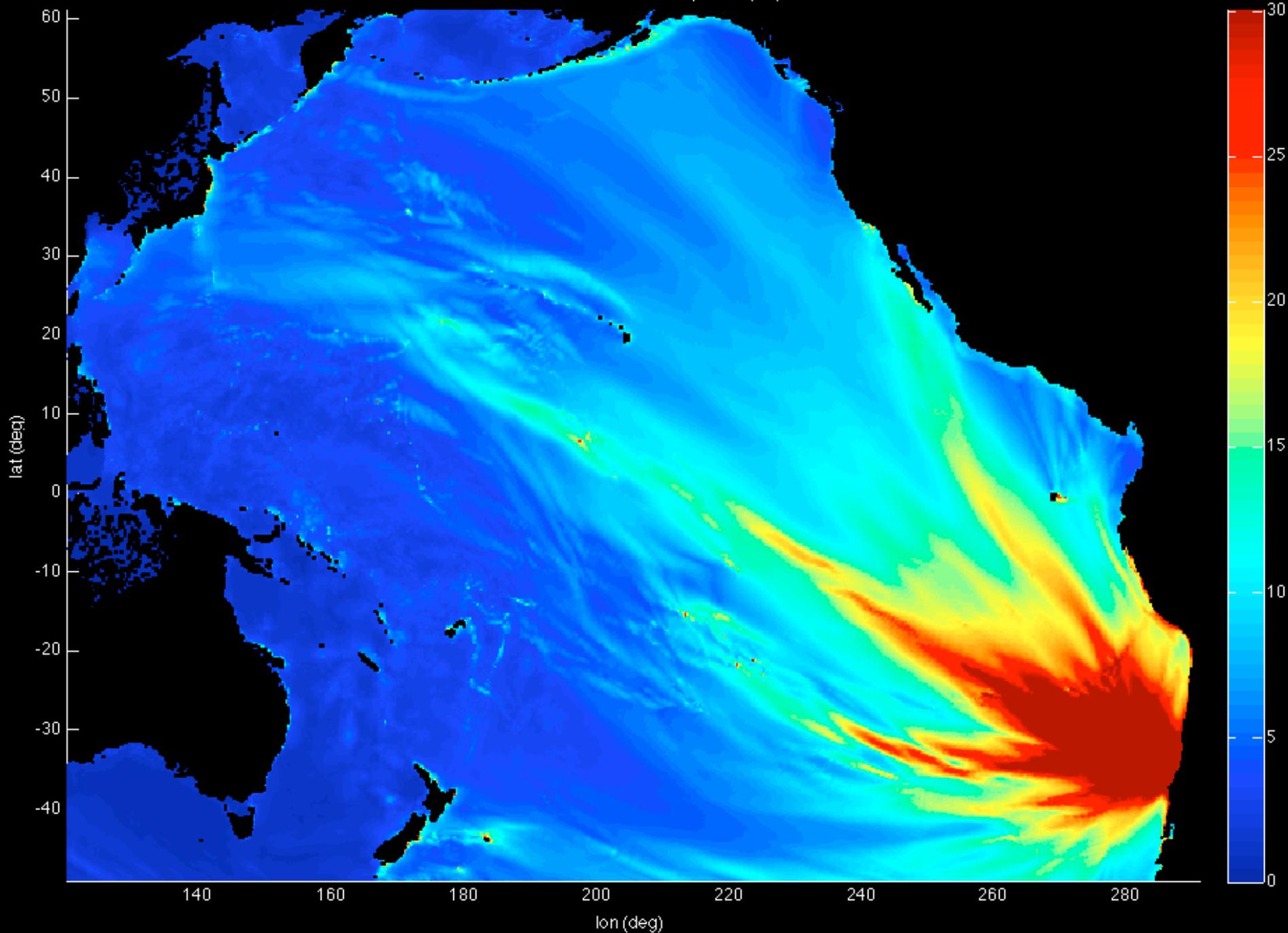
July - September, 1989



October 5, 2008

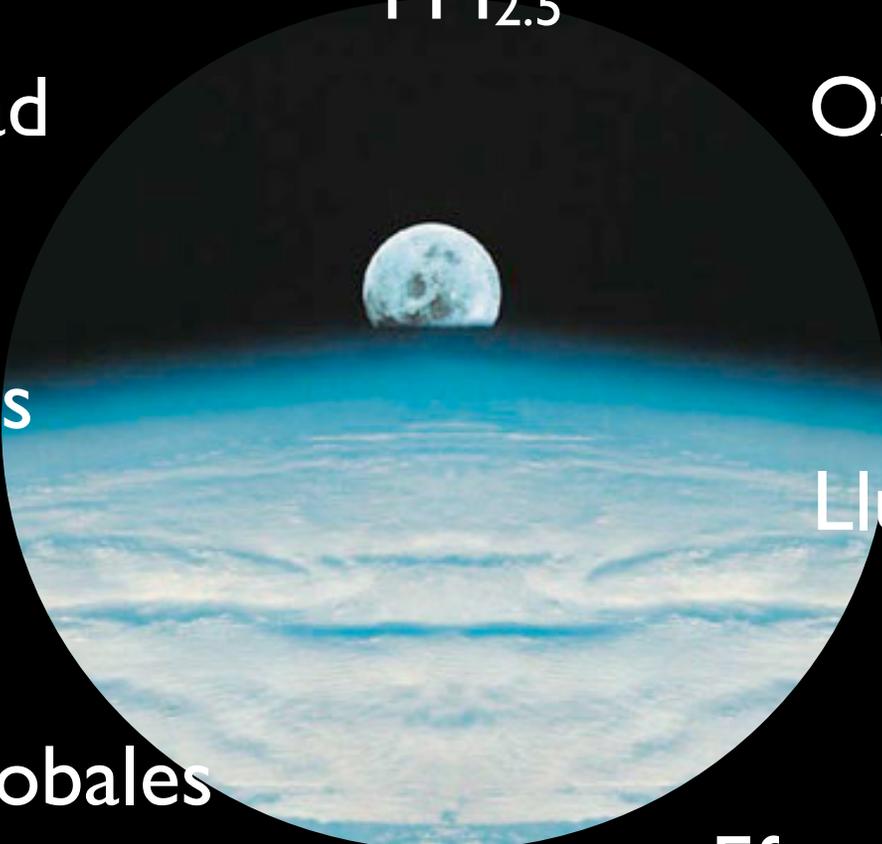
Mar de Aral

CHILE 2010 Maximum Amplitude (cm)





ATMO



PM_{2.5}

Visibilidad

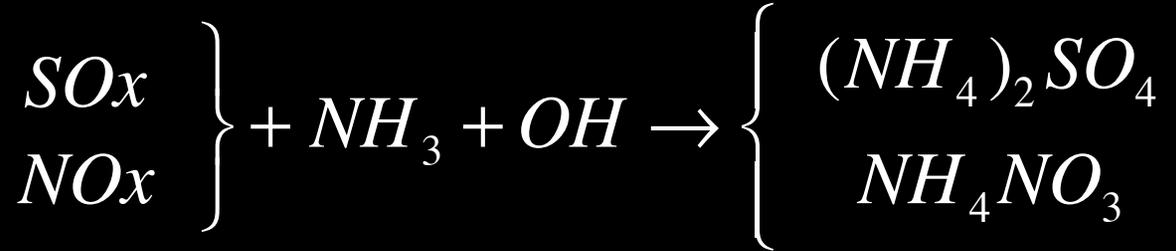
Ozono

Eventos Naturales
Extremos

Lluvia acida

Cambios globales

Efectos



PM_{2.5}

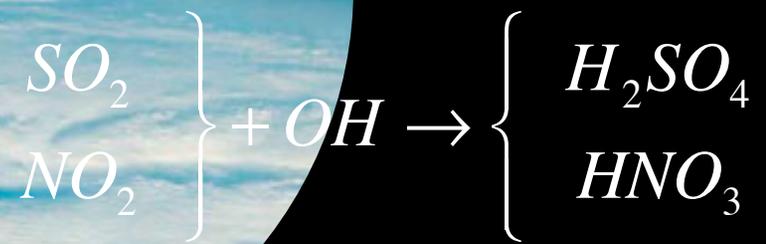
Visibilidad

Nitratos + Sulfatos + PM_{org}

Ozono



Lluvia acida

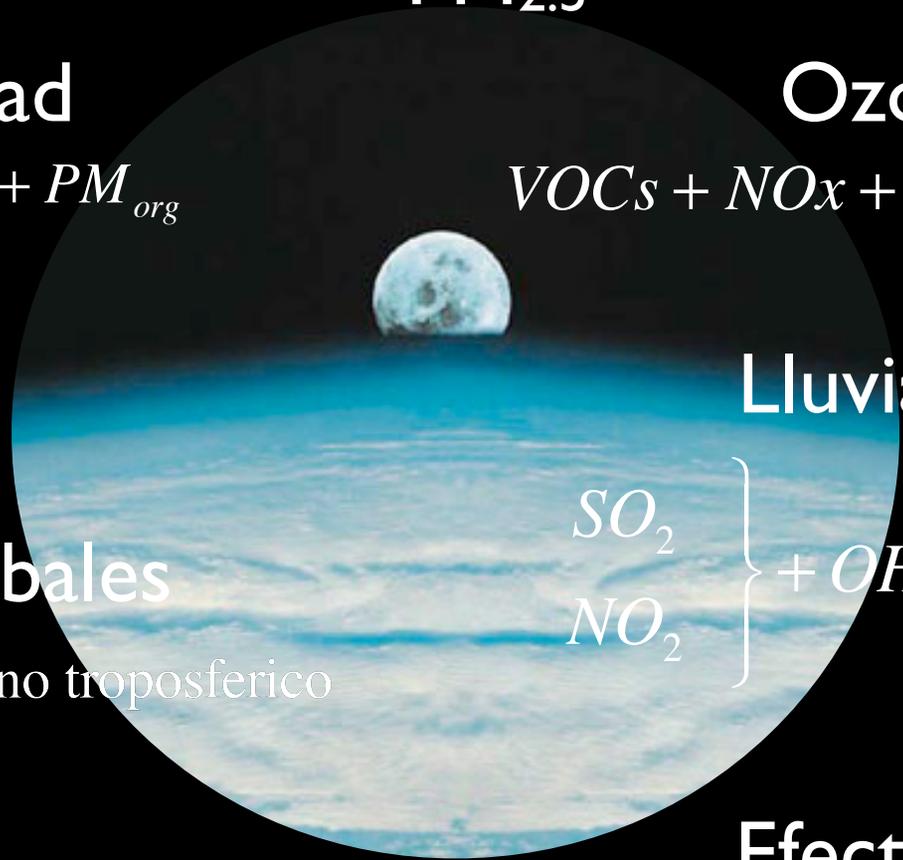


Cambios globales

Cambio Climatico y Ozono troposferico

Efectos

Personas, animales, plantas y materiales



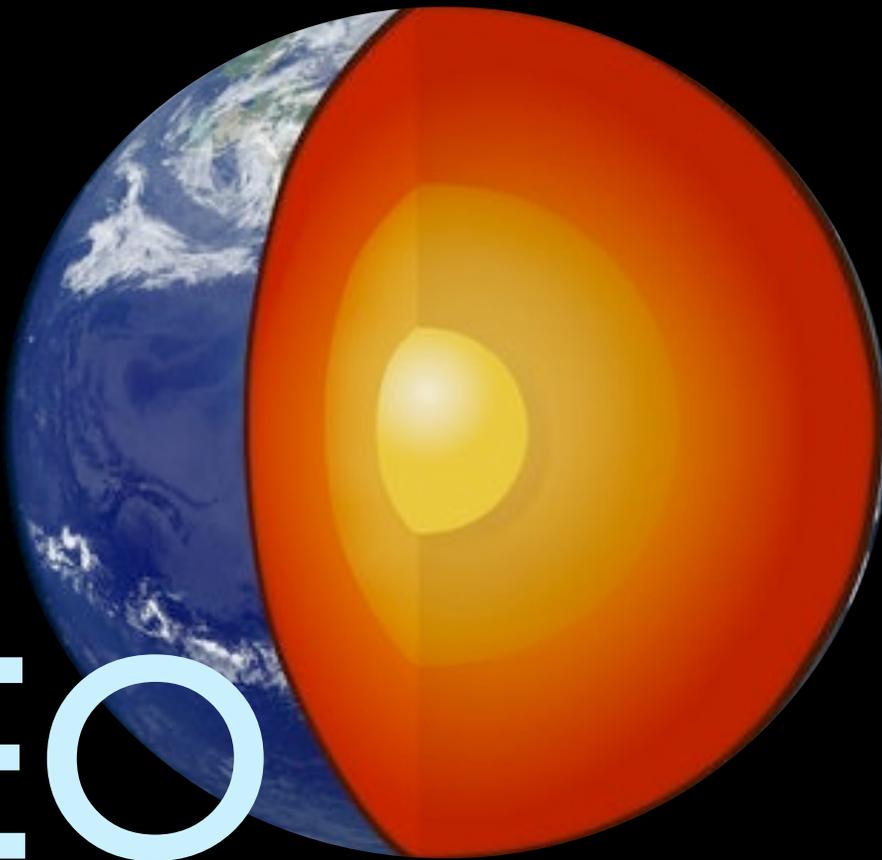


Santiago de Chile

GEO



GEO







Chaiten de Chile

BIO





BIO

Uso de suelos

Biodiversidad

Recursos Naturales

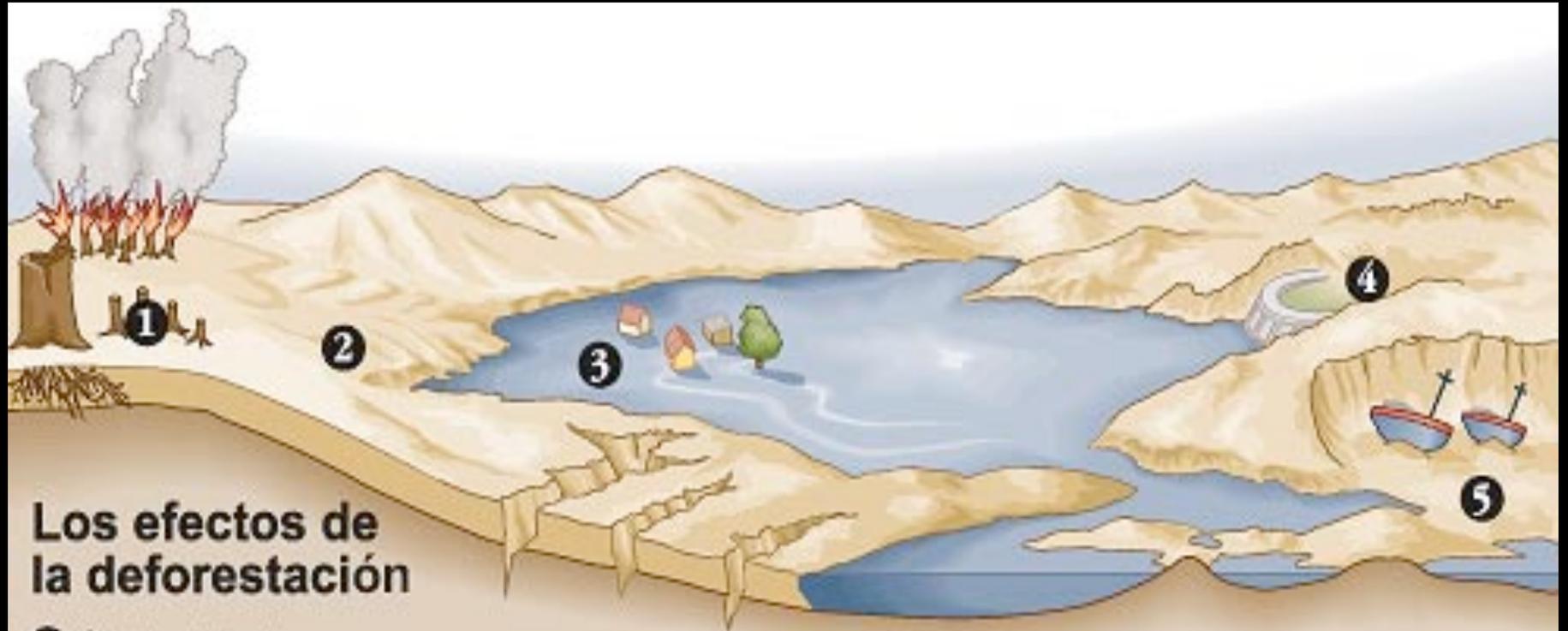


Biomasa

Cambios globales



Pudu, Chile



Los efectos de la deforestación

- 1 Árboles talados.
- 2 Al carecer de la protección de los árboles, el suelo es arrastrado por las pendientes, lo que causa deslizamiento de tierras y pérdidas en las cosechas.
- 3 El suelo eleva los lechos de los ríos, ocasionando inundaciones.
- 4 La tierra rellena los pantanos, acortando la vida de las represas.
- 5 Los sedimentos arrastrados forman nuevas islas en los estuarios y reducen las pesquerías de las zonas costeras.

Química - Física - Orografía - Meteorología - Fuentes y Sumideros



ANTROPO



ANTROPO

Sustentabilidad

Futuro Urbano

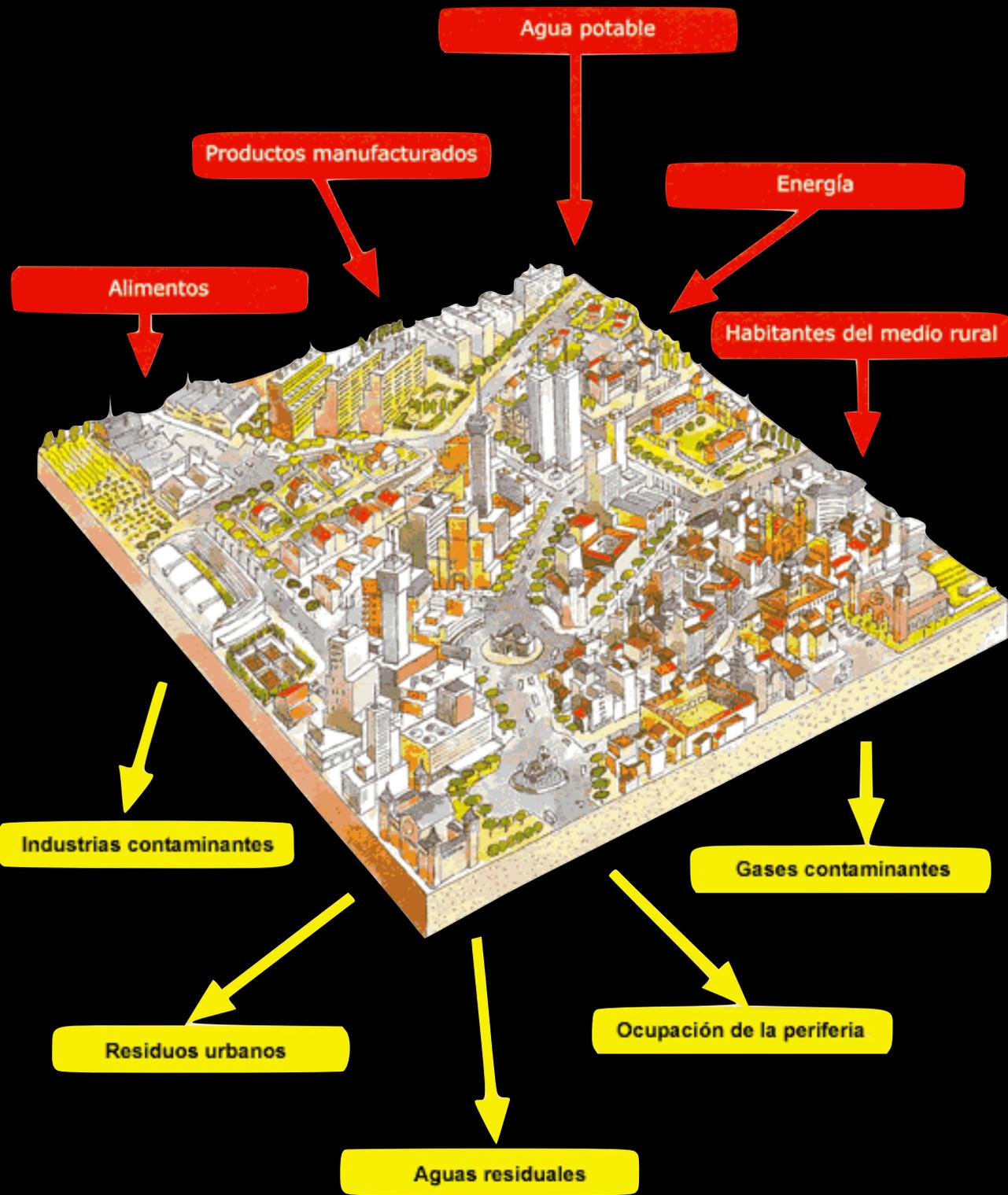
Recursos Naturales

Calidad de Vida



World Population (est.) 10,000 BC - 2,000 AD





Agua potable

Productos manufacturados

Energía

Alimentos

Habitantes del medio rural

Industrias contaminantes

Gases contaminantes

Residuos urbanos

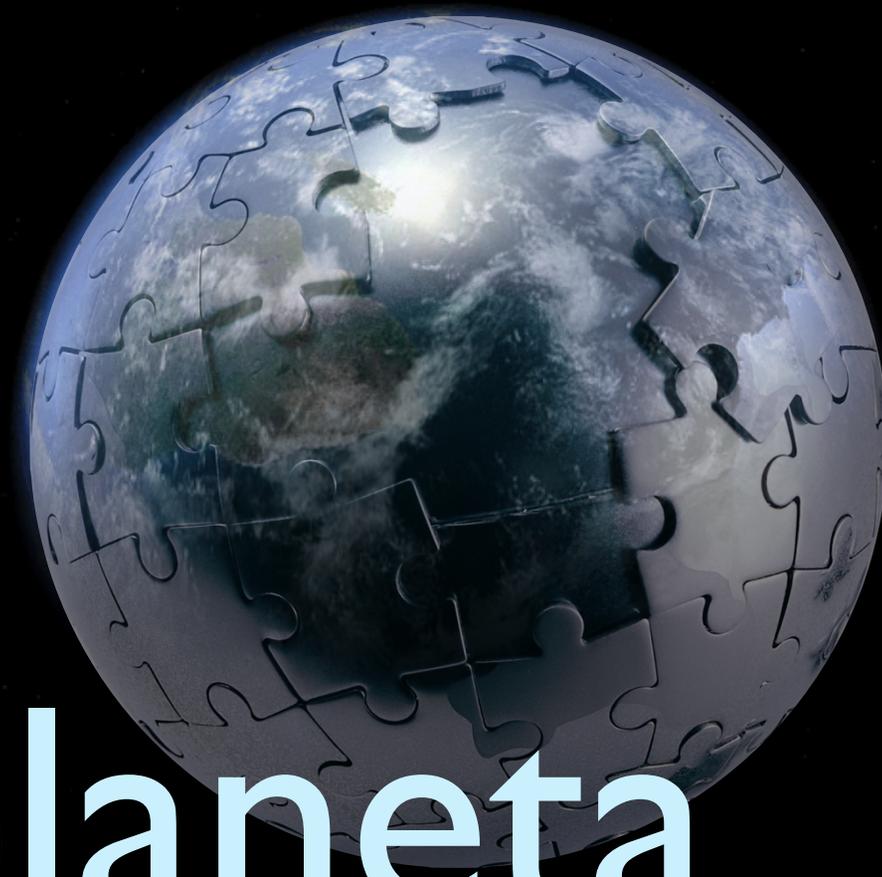
Ocupación de la periferia

Aguas residuales





Un planeta



Un planeta

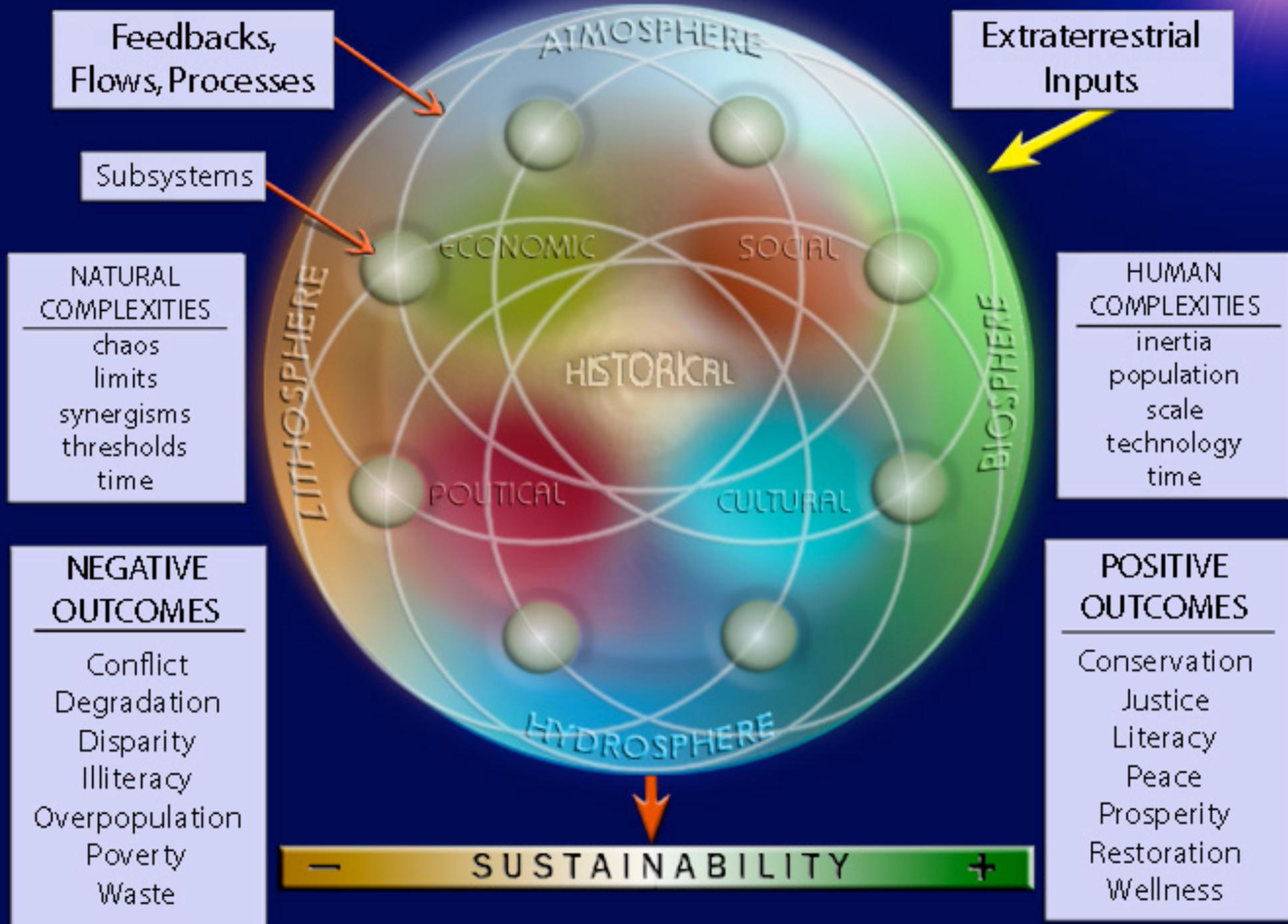


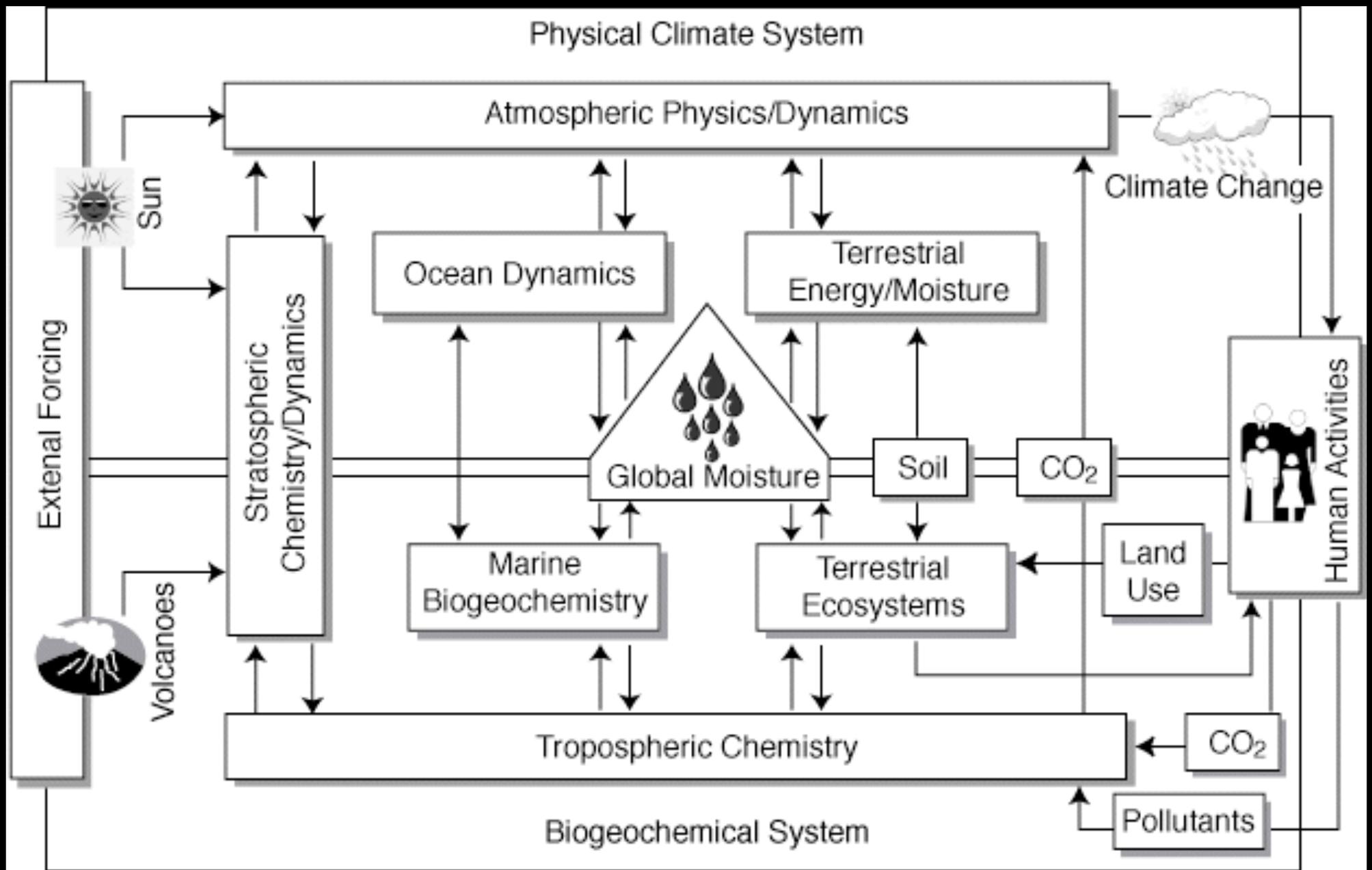
Interaccion

Una Tierra... varias esferas



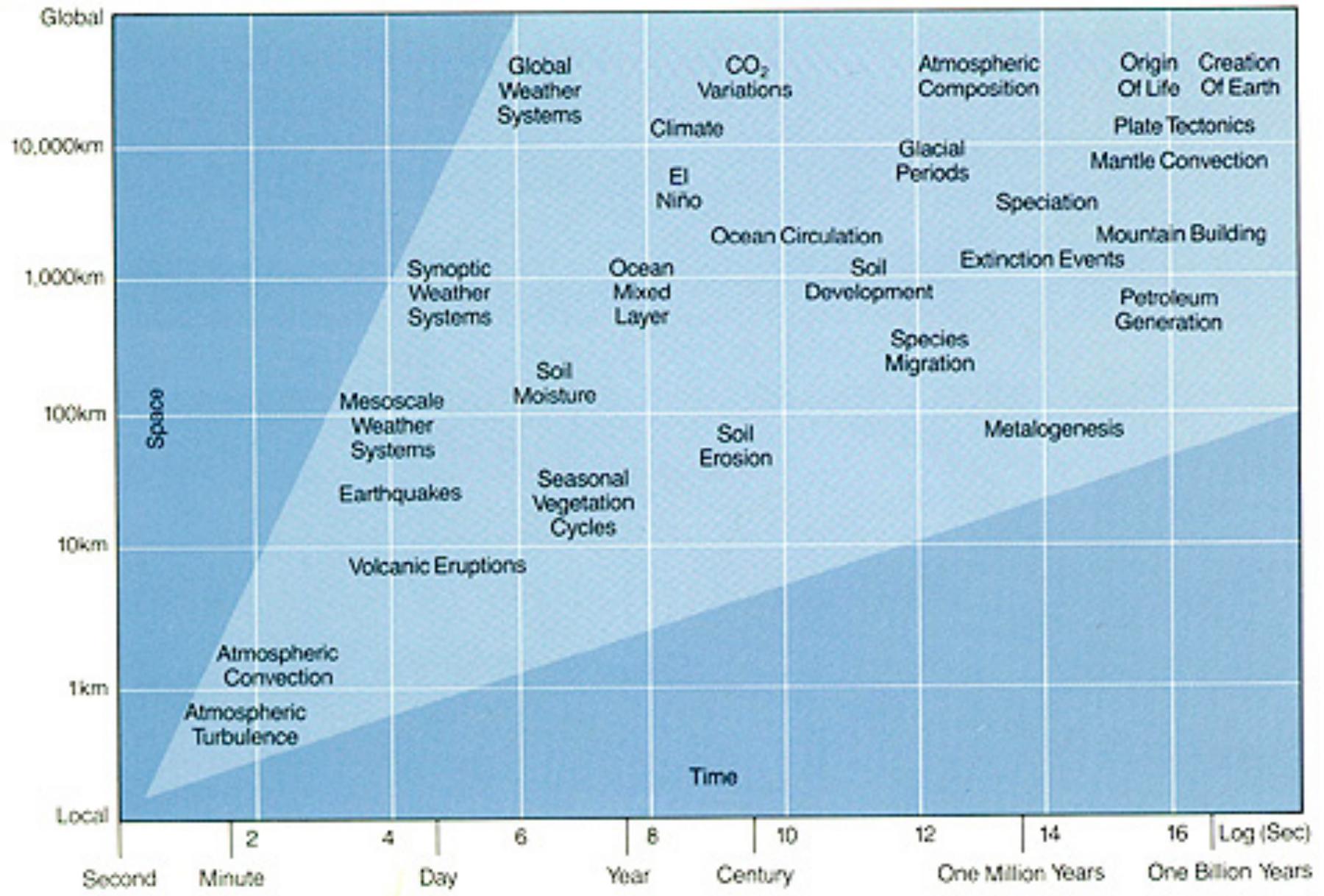
EARTH SYSTEMS



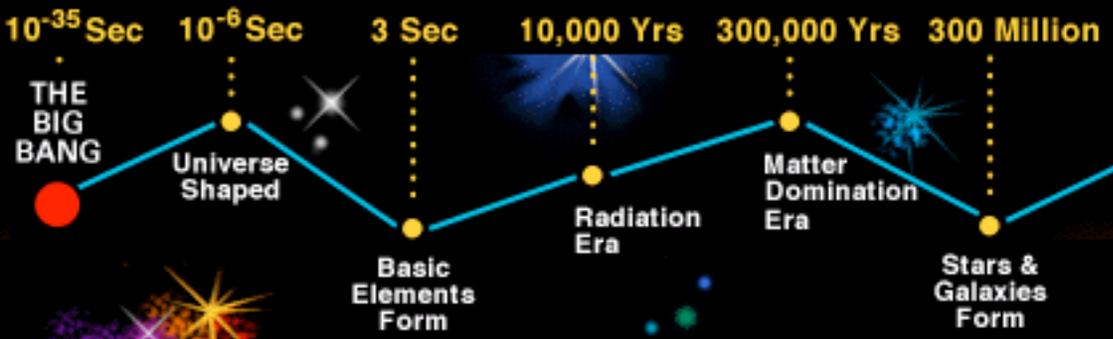




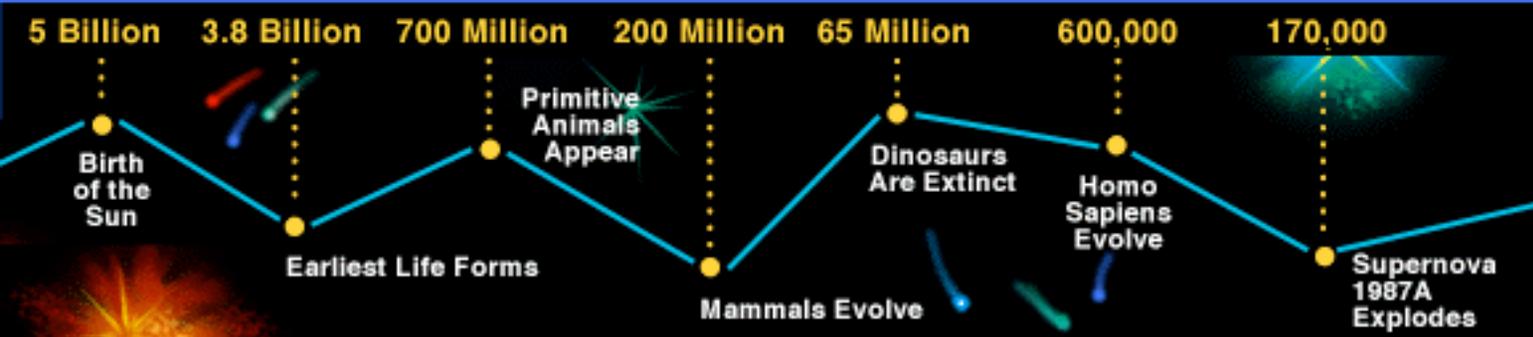
Espacio y Tiempo



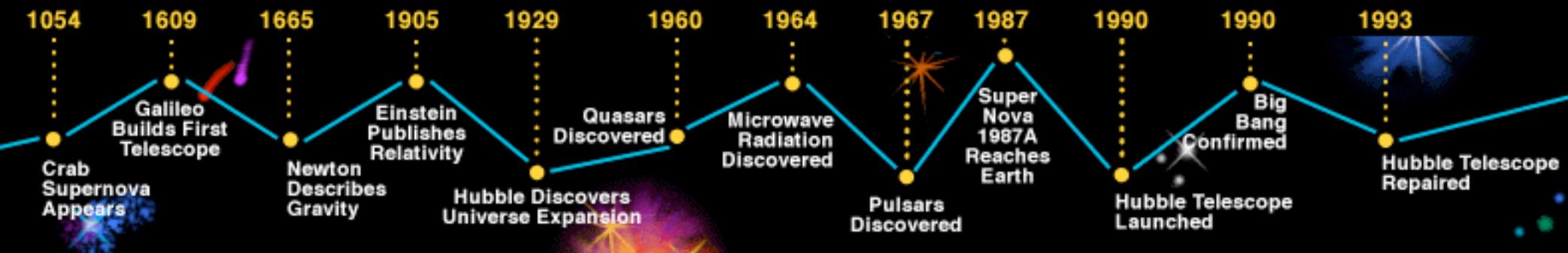
TIME AFTER THE BIG BANG

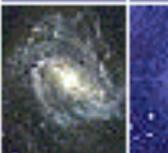
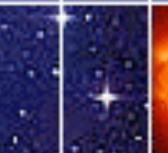
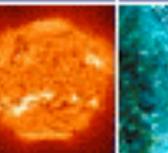
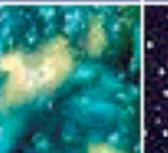
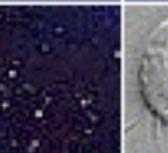
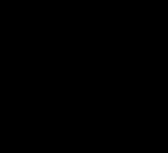
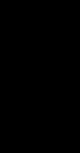


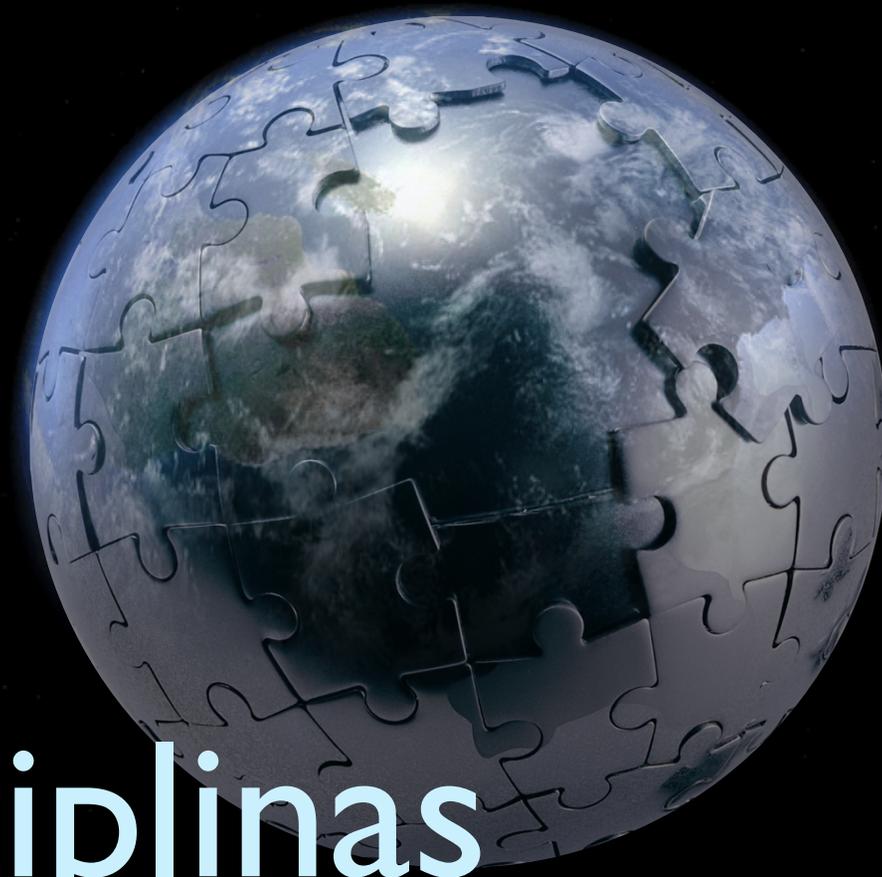
YEARS BEFORE THE PRESENT



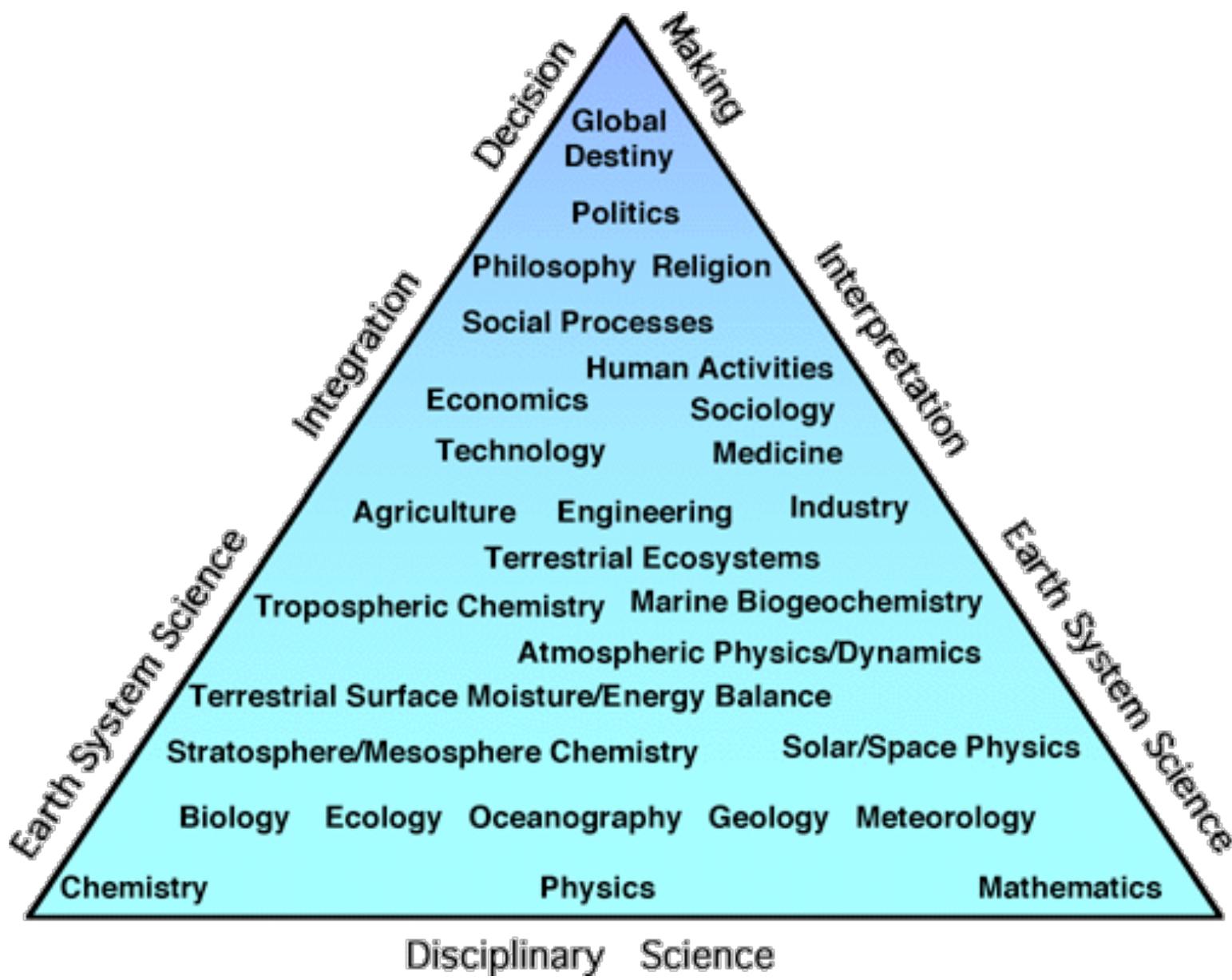
AD



January	February	March	April	May	June	July	August	September	October	November	
											
New Year's Day: The Big Bang		Milky Way forms			Sun and planets form		Oldest known life (single celled).		First multi-cellular organisms		
December											
1	2	3	4	5	6	7	8	9	10	11	
12	13	14	15	16	17	18	19	20	21	22	
23	24	25	26	27	28	29	30	31			
Cambrian Explosion (burst of new life forms)		Emergence of first vertebrates		Early land plants		First four-limbed animals		Variety of insects begin to flourish		First dinosaurs appear	
First mammalian ancestors appear		First known birds		Apes appear		First human ancestors to walk upright		Homo erectus appears		Anatomically modern humans appear	
Dinosaurs wiped out by asteroid or comet		Invention of writing		Pyramids built in Egypt		1 second before midnight: Voyage of Christopher Columbus					



Disciplinas



- Mañana...Taller

- ¿Medio ambiente?

- ¿Ciencias Ambientales?