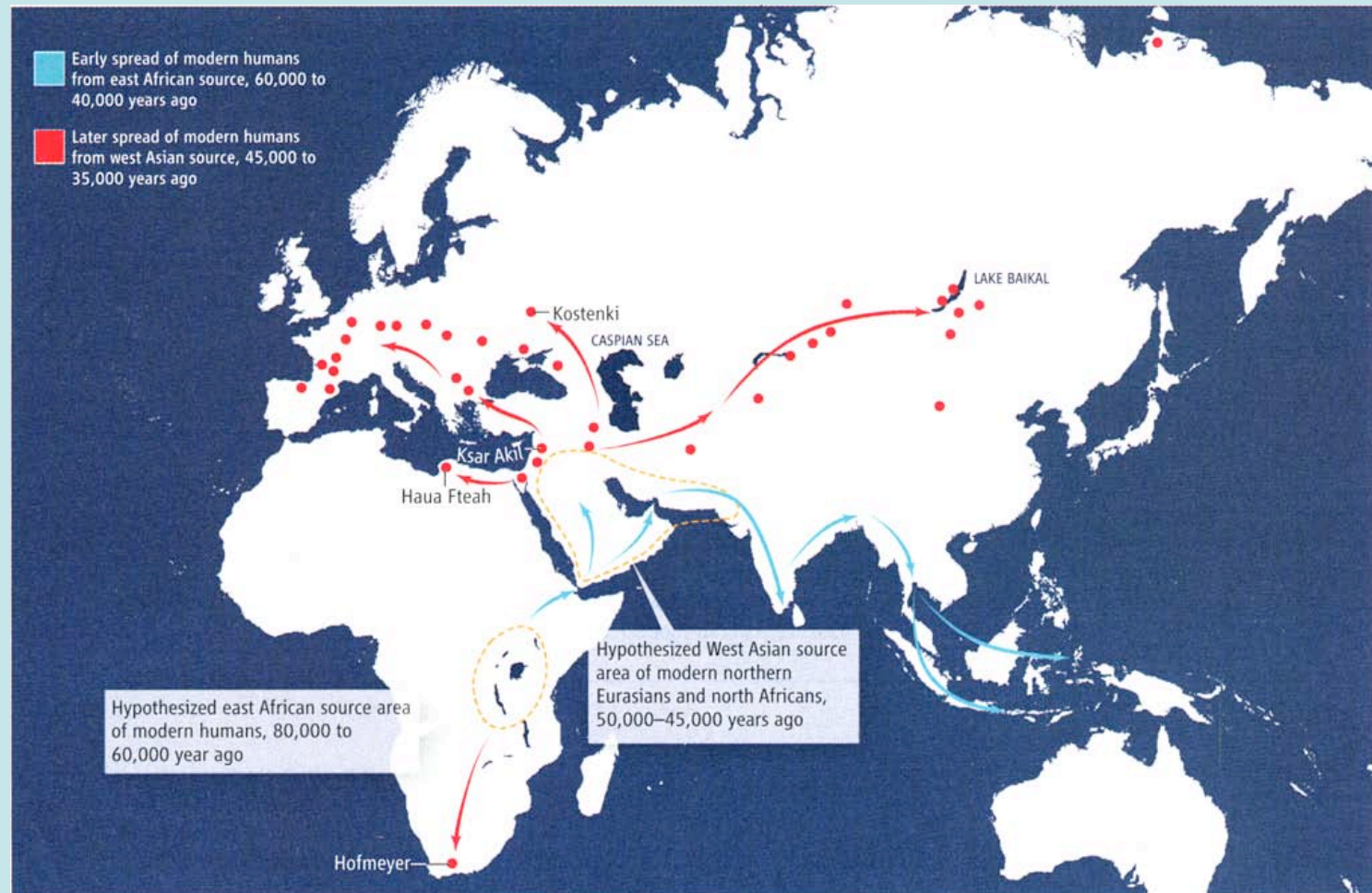


Out Of Africa




Human pathways. Reconstructed spread of modern humans during the late Pleistocene, and locations of some key early Upper Paleolithic archaeological sites. Grine *et al.*, Olivieri *et al.*, and Anikovich *et al.* provide new evidence confirming that early modern humans spread from southwestern Asia into northern Africa, Europe, and Russia about 45,000 to 40,000 years ago.

What is Meant by Sustainability?

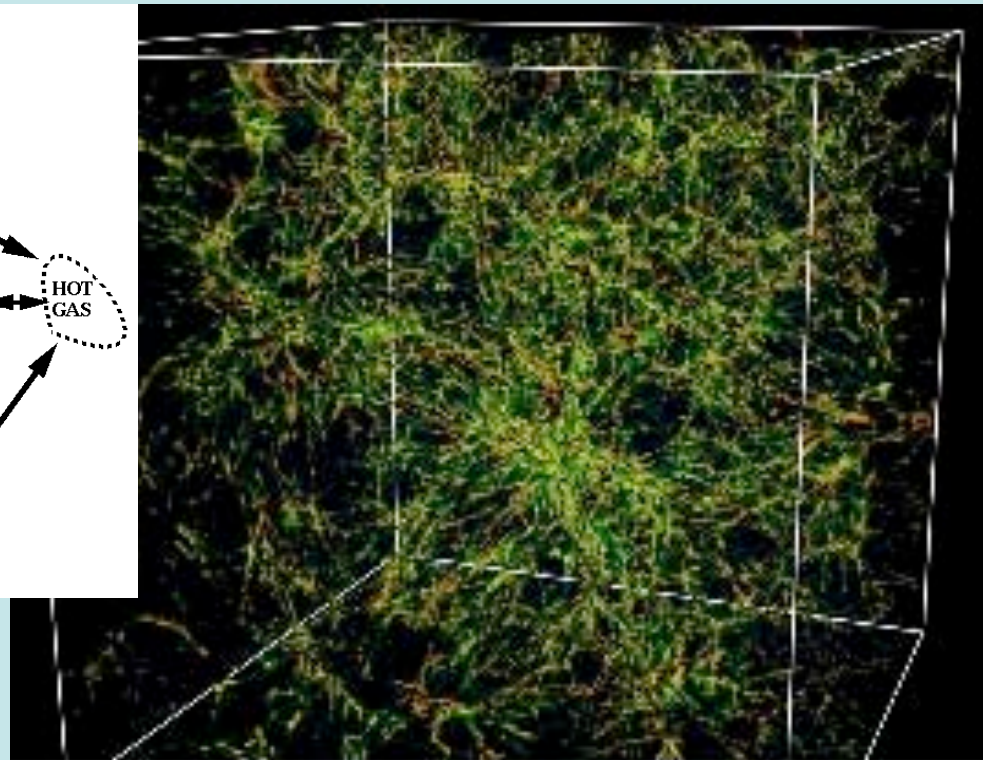
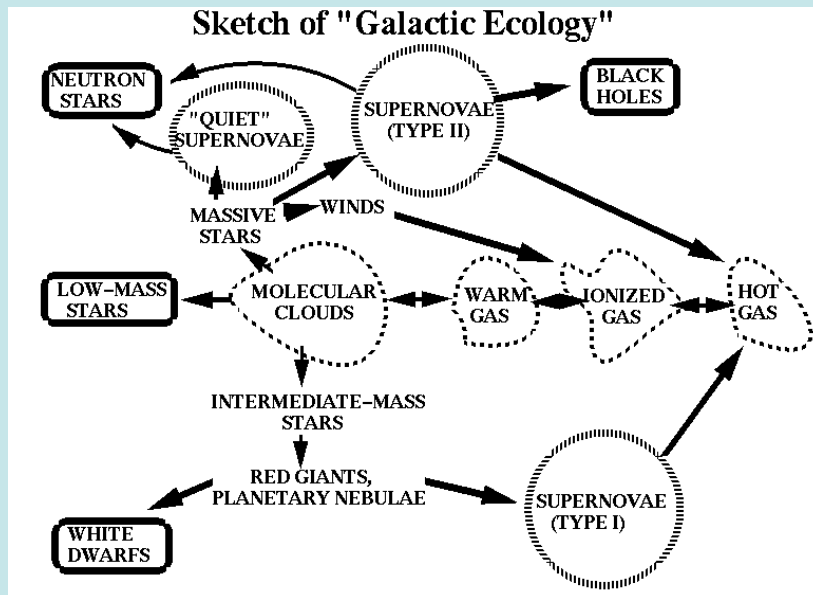


Sustainable Systems in Nature

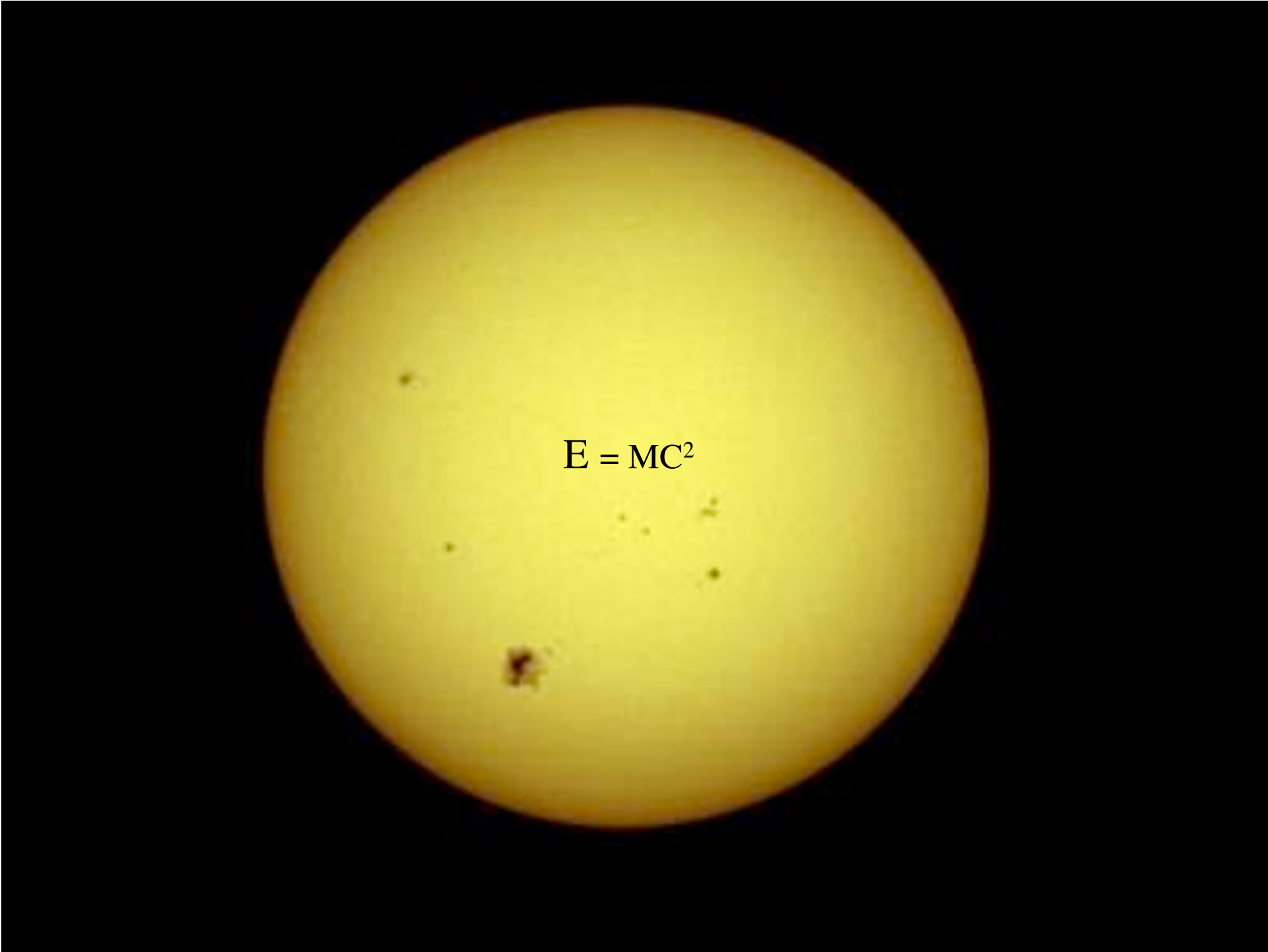



Re-cycling "Star stuff"

Galactic Ecosystems



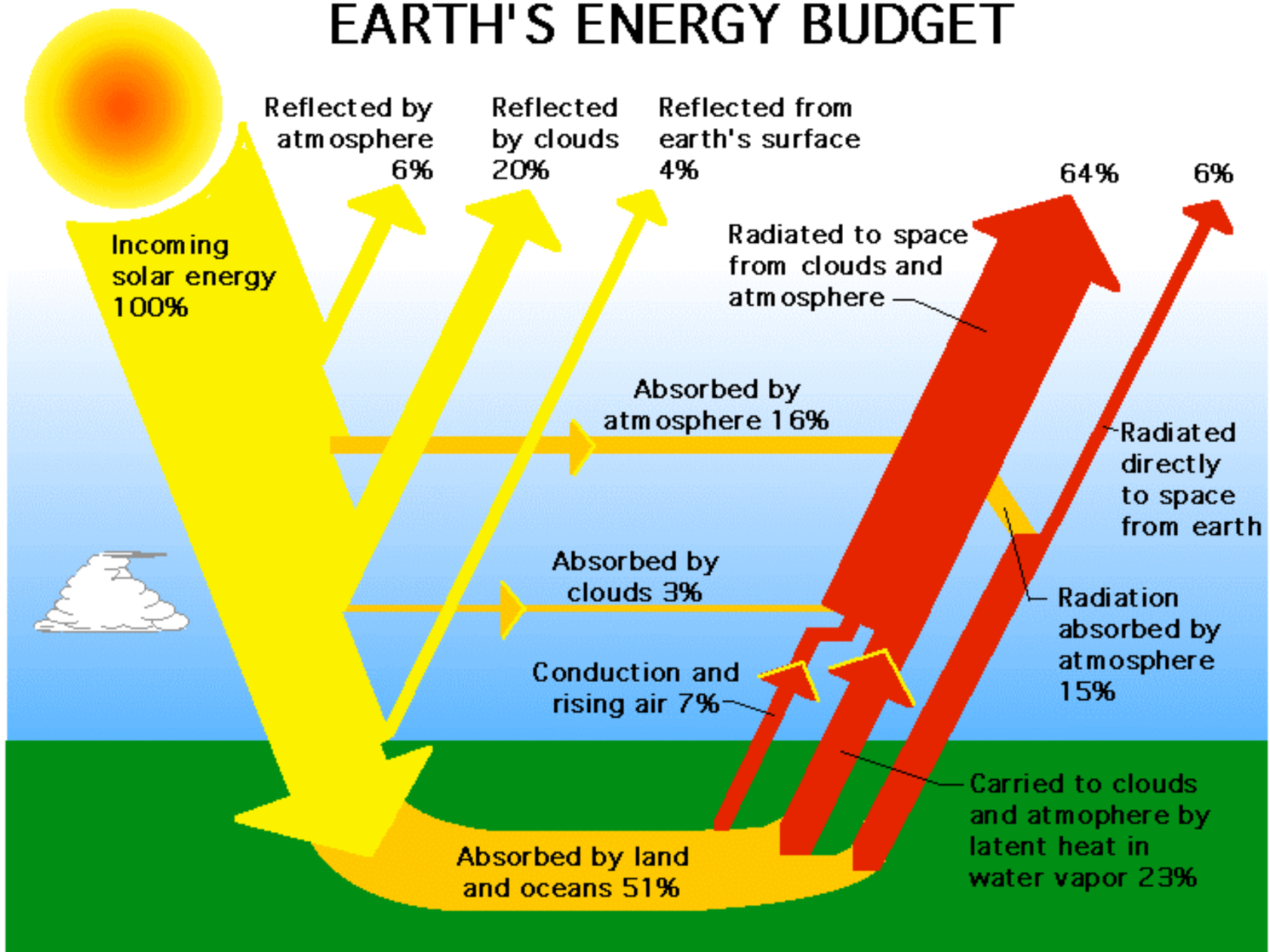
The Universe as we know it


A large, bright yellow sphere is centered on a solid black background. The sphere has a slightly textured appearance with some minor dark spots and a gradient of light. In the center of the sphere, the equation $E = MC^2$ is written in a black, serif font.
$$E = MC^2$$



The solar constant = 2 calories/cm²/min

EARTH'S ENERGY BUDGET





Gaia Hypothesis

*Natural Systems Create and
Maintain Conditions
That Support Life On Earth*



Photosynthesis



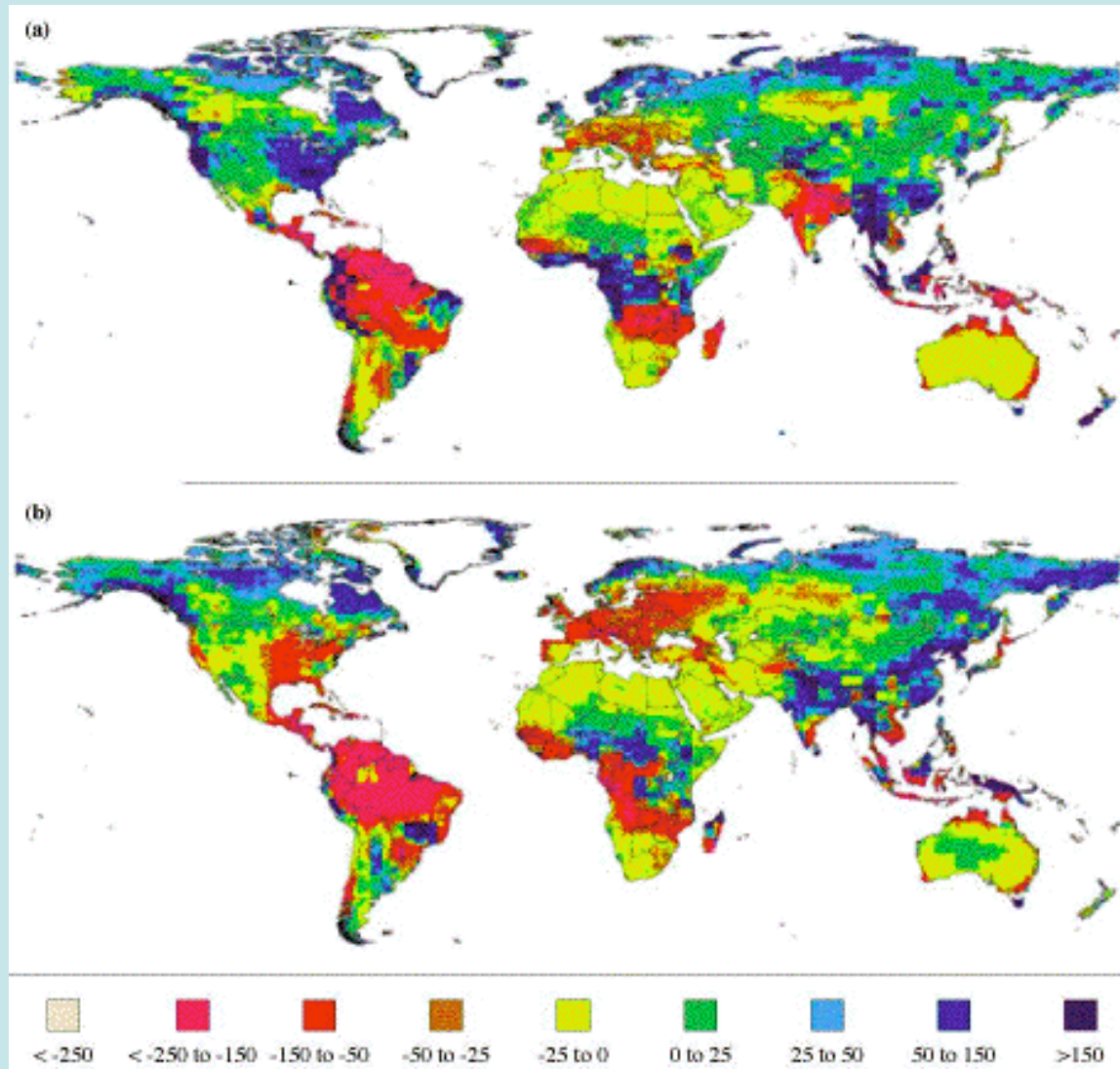
↑
ie. algae

Carbohydrates + Oxygen as products

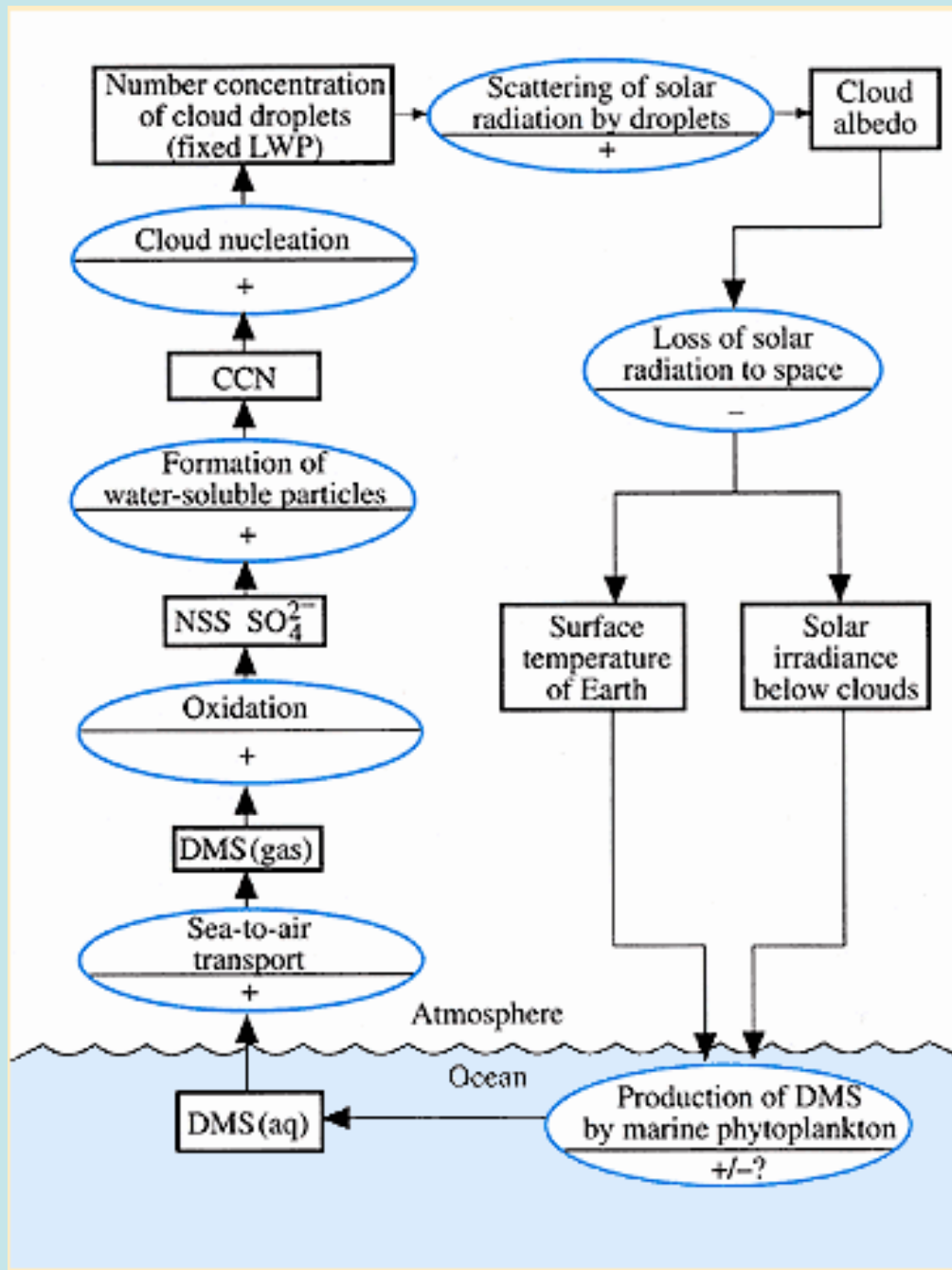
1 mole of CO_2 consumed
as 1 mole of O_2 produced

→ Controls surface water ocean chemistry of inorganic carbon and nutrients and, when combined with respiration, controls atmospheric CO_2 concentration.

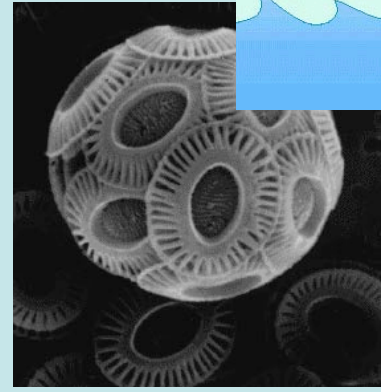
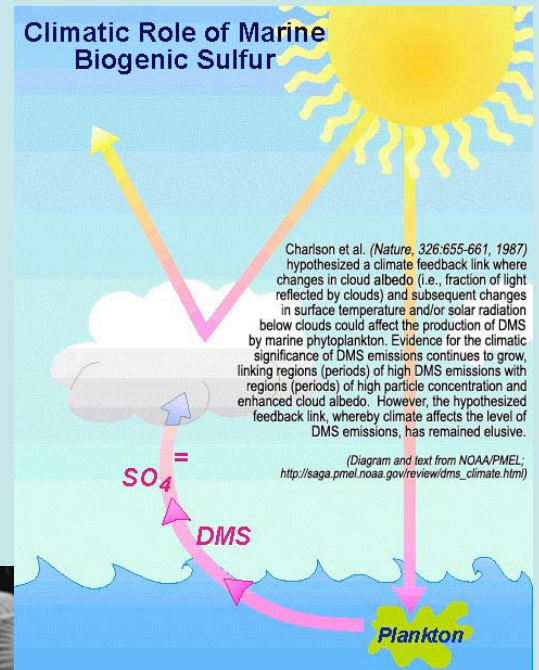
Earth's Ecosystems



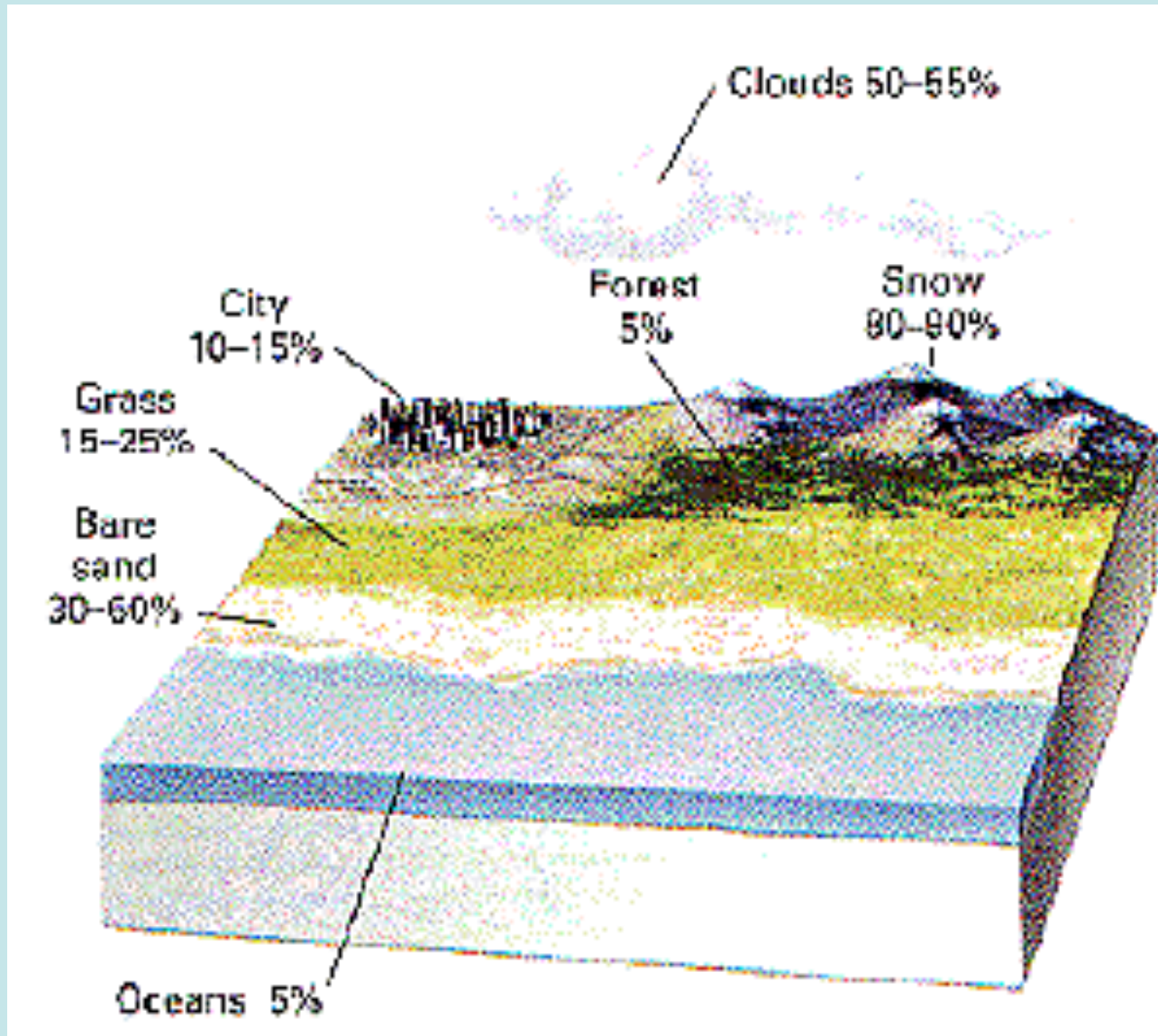
Cloud Formation



Charlson et al in: Oceanography (Summerhaze & Thorpe eds.)1996



Result: 20° C Average Earth Temperature





Teaching Cities to
Behave like Natural
Systems

Urban Pollution

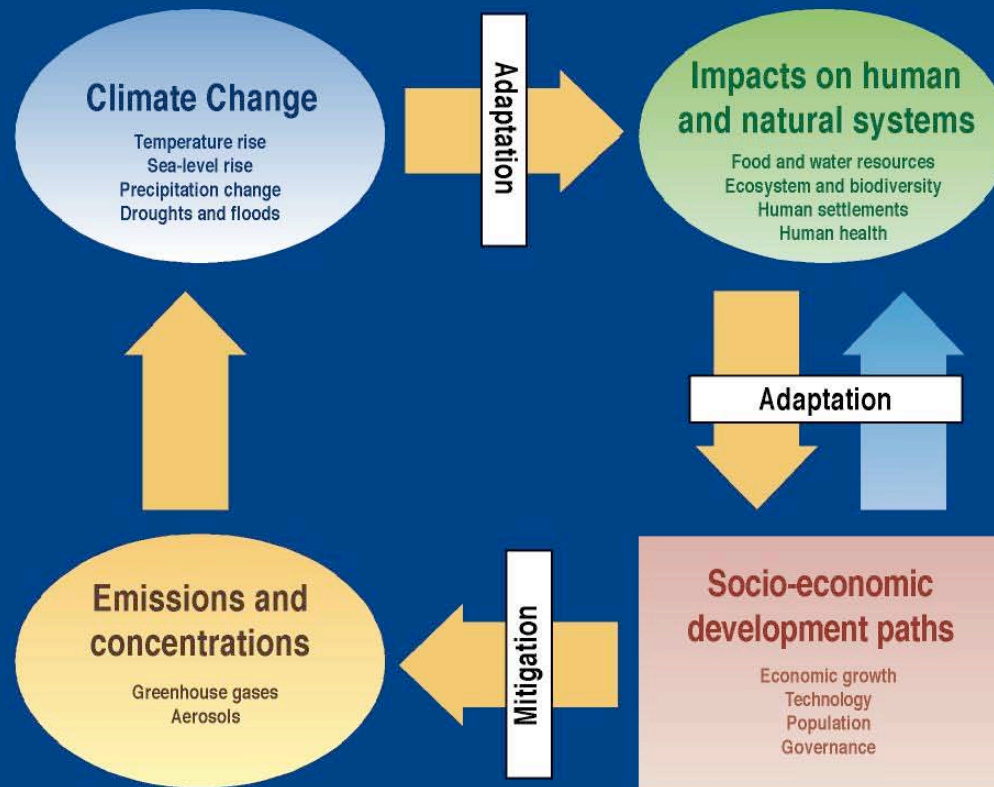




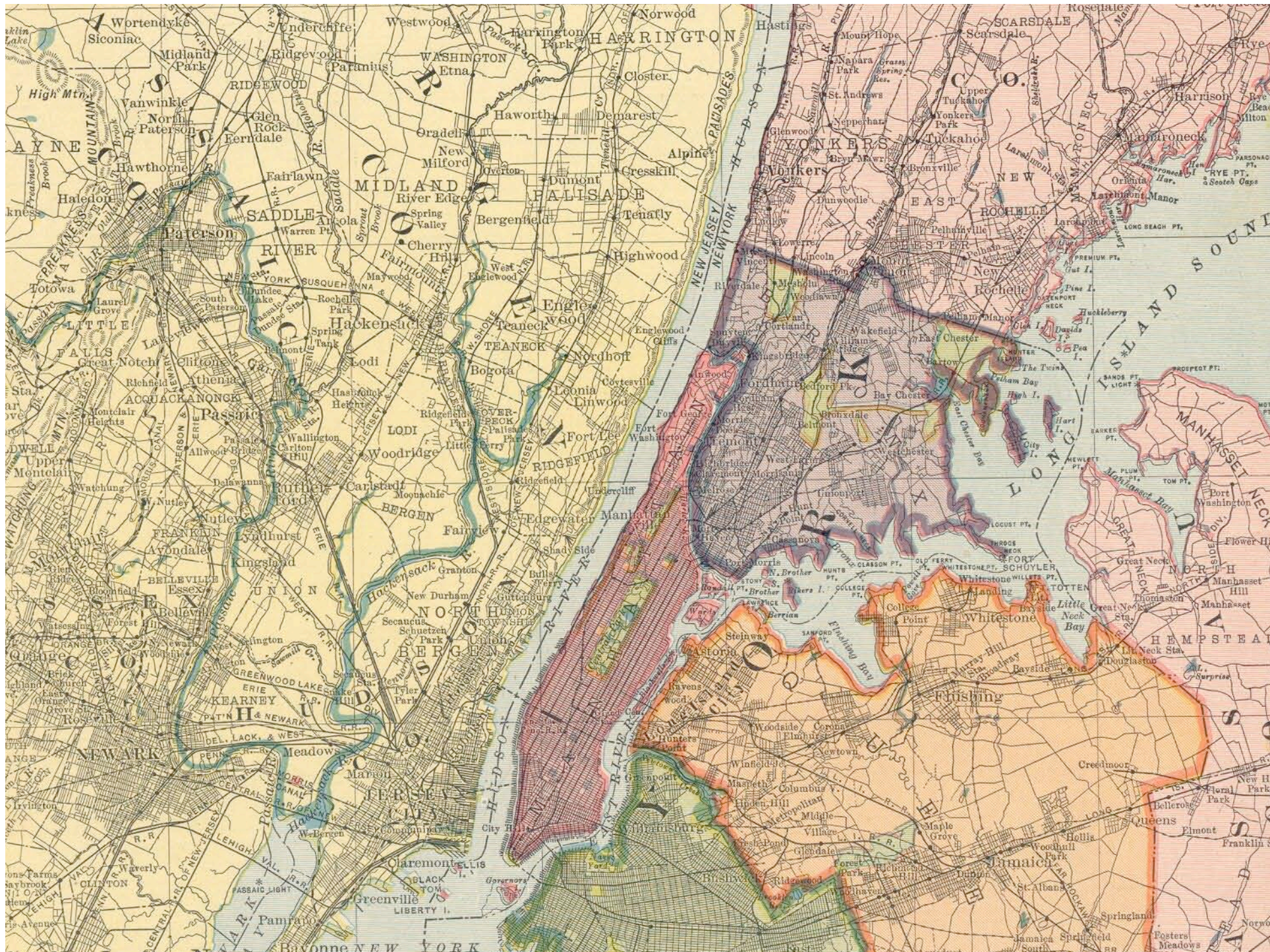
DOSSIER
Urban pollution

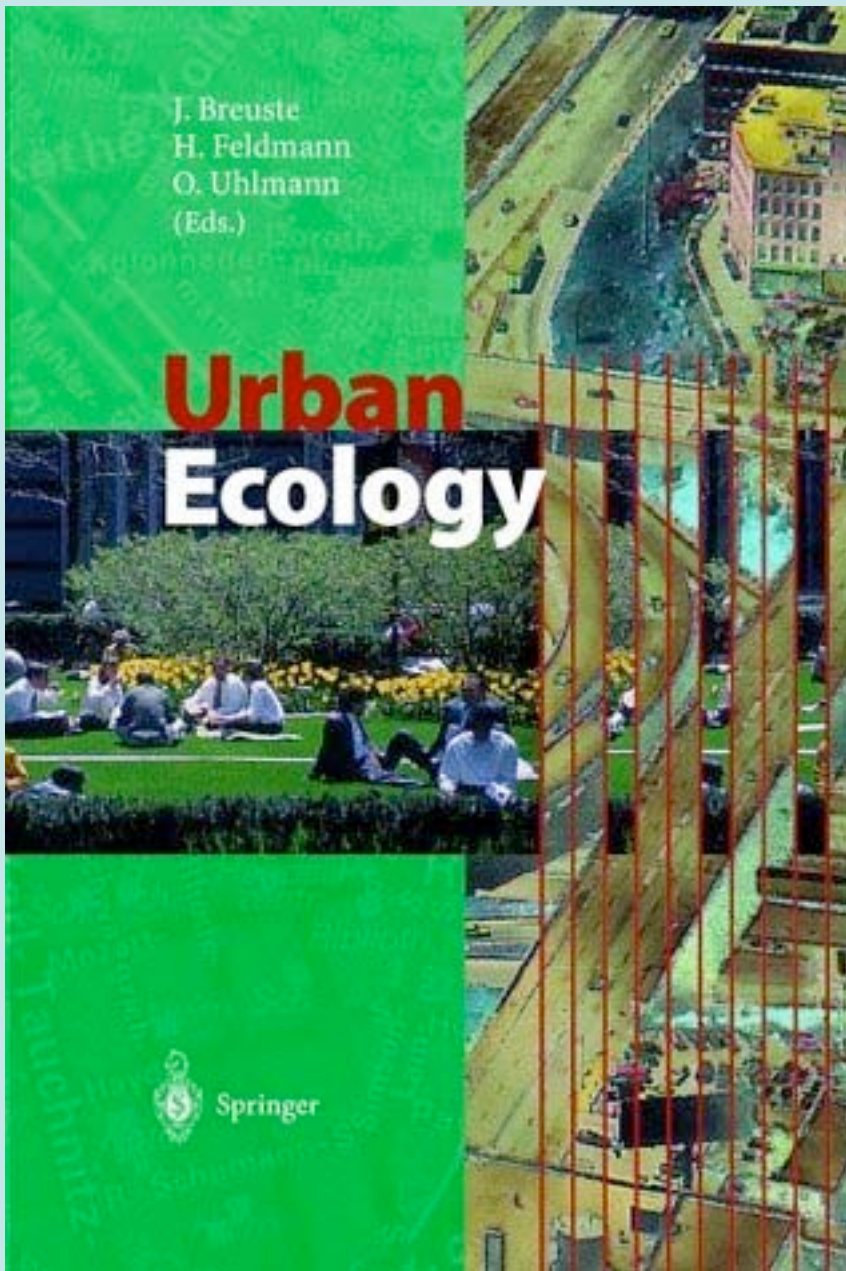


Climate Change - an integrated framework



SYR FIGURE 1-1





Concepts in Urban Sustainability



Urban Ecology



Educating for the Management of Cultural Landscapes



A Trans-Atlantic Student Exchange Program with partners in the USA (Oregon, Pennsylvania, Wisconsin) and in Europe (Germany, The Netherlands, Spain)

FARMING IN THE Z-AXIS:

THE VERTICAL FARM

6TH STREET BASIN,
GOWANUS CANAL, BROOKLYN

- HEALTHY TRANSPORTATION
ALTERNATIVES

- CROPS DISTRIBUTED LOCALLY
AND REGIONALLY

- EXISTING BUILDINGS
REACTIVATED

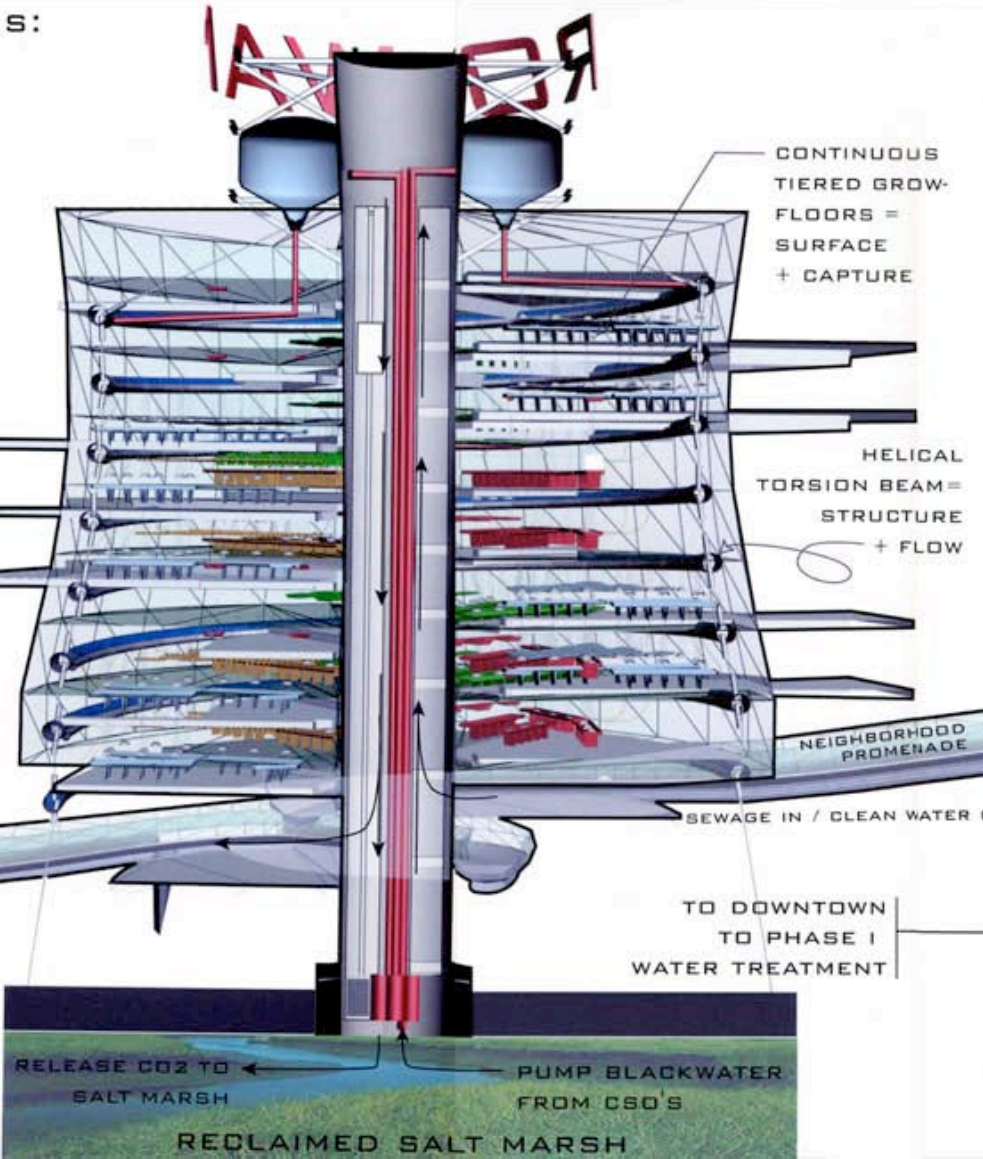
- PUBLIC EDUCATION

- ELECTRICITY GENERATION

- JOB CREATION

NEIGHBORHOOD PROMENADE
RELEASE METHANE TO POWER PLANT

TO POWER STATION
TO PARKING
TO PROSPECT PARK



CONTINUOUS
TIERED GROW-
FLOORS =
SURFACE
+ CAPTURE

HELICAL
TORSION BEAM =
STRUCTURE
+ FLOW

NEIGHBORHOOD
PROMENADE

SEWAGE IN / CLEAN WATER OUT

TO DOWNTOWN
TO PHASE I
WATER TREATMENT

RELEASE CO2 TO
SALT MARSH

PUMP BLACKWATER
FROM CSO'S

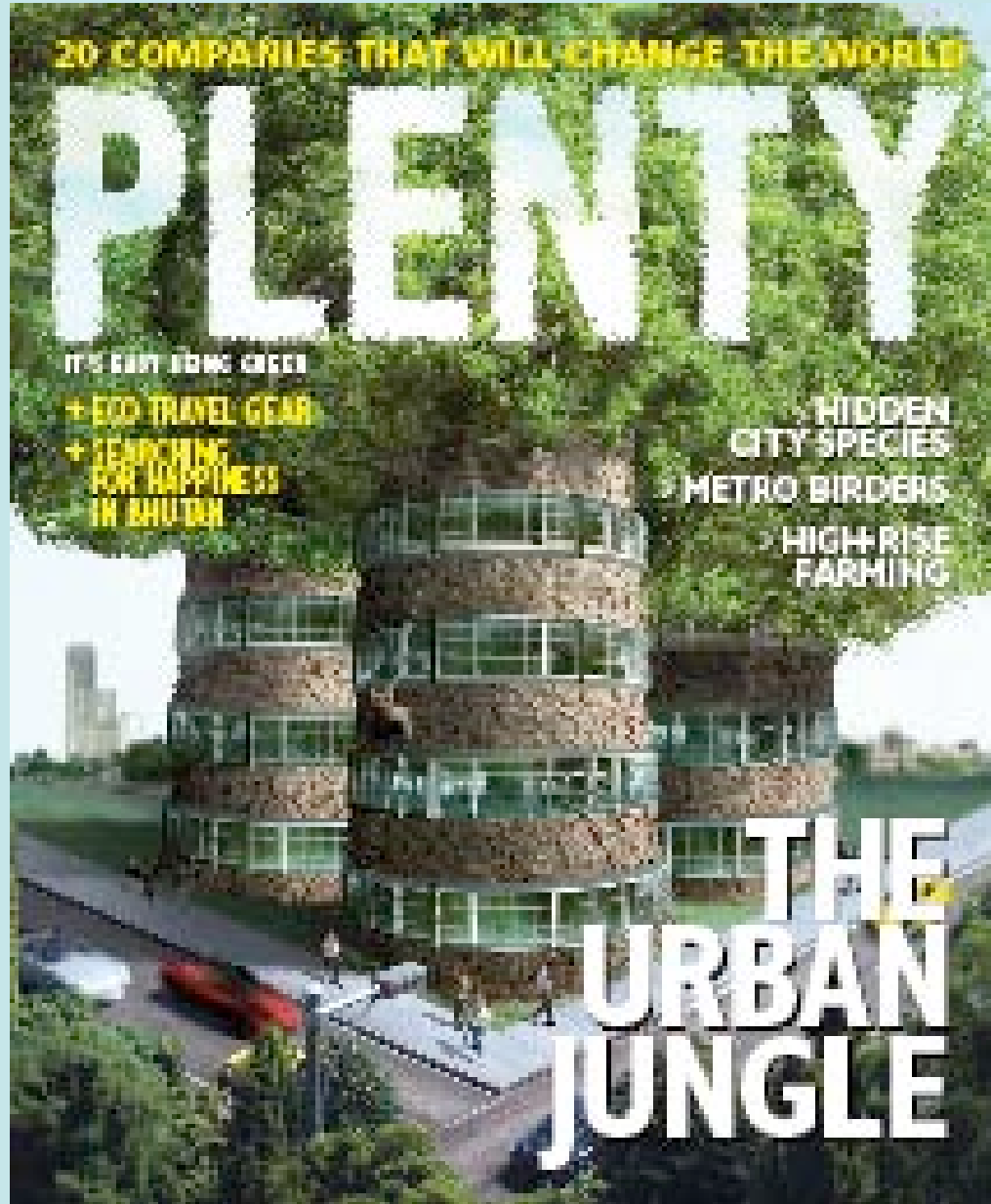
RECLAIMED SALT MARSH

- + PUBLIC SIGNAGE
- + STRUCTURAL MAST & HOLDING TANKS
- + BLACKWATER BIOGAS REACTOR
- + COMPOSTABLE PLANT PRODUCTION
- + EDIBLE CROP PRODUCTION: 24 HOUR/365 DAY HYDROPONIC GROWING
- + DECORATIVE PLANT PRODUCTION
- + PUBLIC INTERCHANGE PLATFORM
- + GREENMARKET/ PUBLIC ACCESS TO SALT MARSH
- PUMPING STATION/ UNDERGROUND PARKING

The Vertical Farm Project

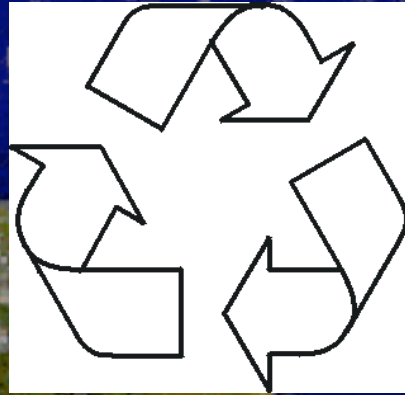


Chris Jacobs



Getting the word out

In the end, sustainability means to be able to provide for yourself!



Urban centers need to behave in this fashion if we are to survive the next 50 years!

You can help!

