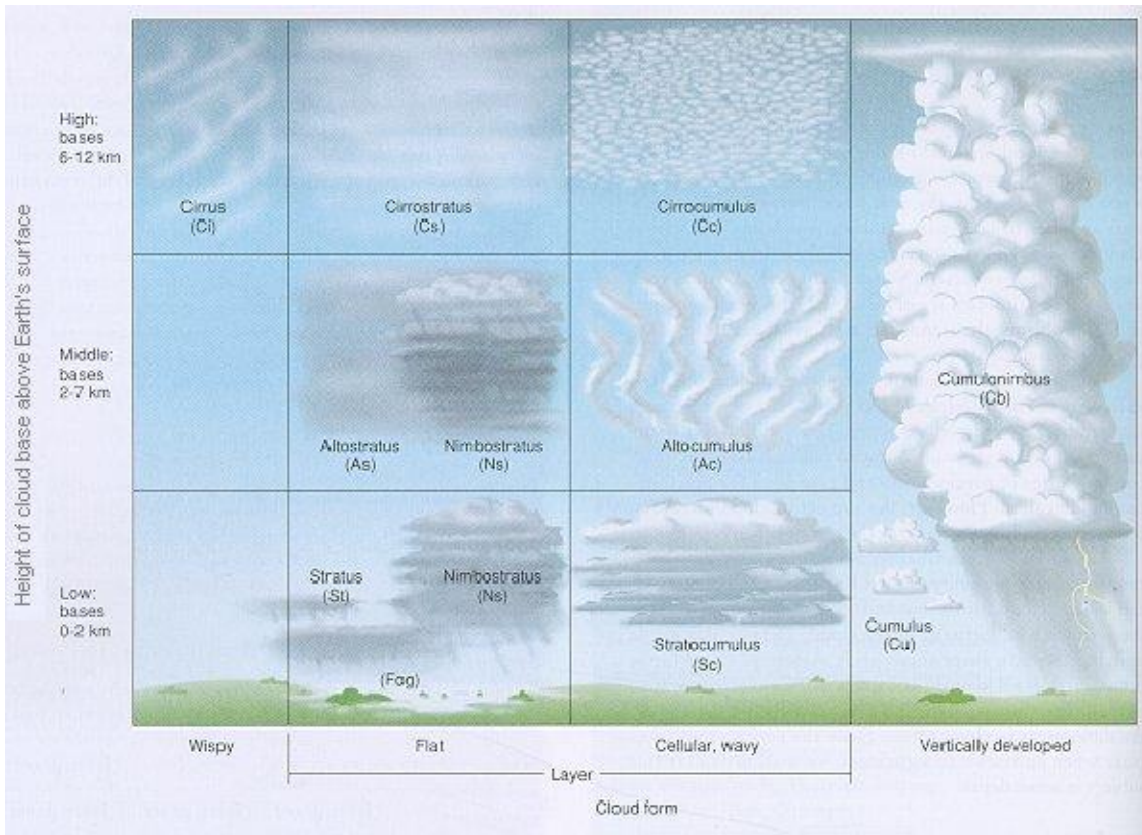


Cloud types: cirrus, cirrocumulus, cirrostratus, altocumulus, altostratus, nimbostratus, stratocumulus, stratus, cumulus, cumulonimbus.

	Polar regions	Temperate Regions	Tropics
High (“cirro”)	3-8 km	5-13 km	6-18 km
Middle (“alto”)	2-4 km	2-7 km	2-8 km
Low (“strato”)	0-2 km	0-2 km	0-2 km

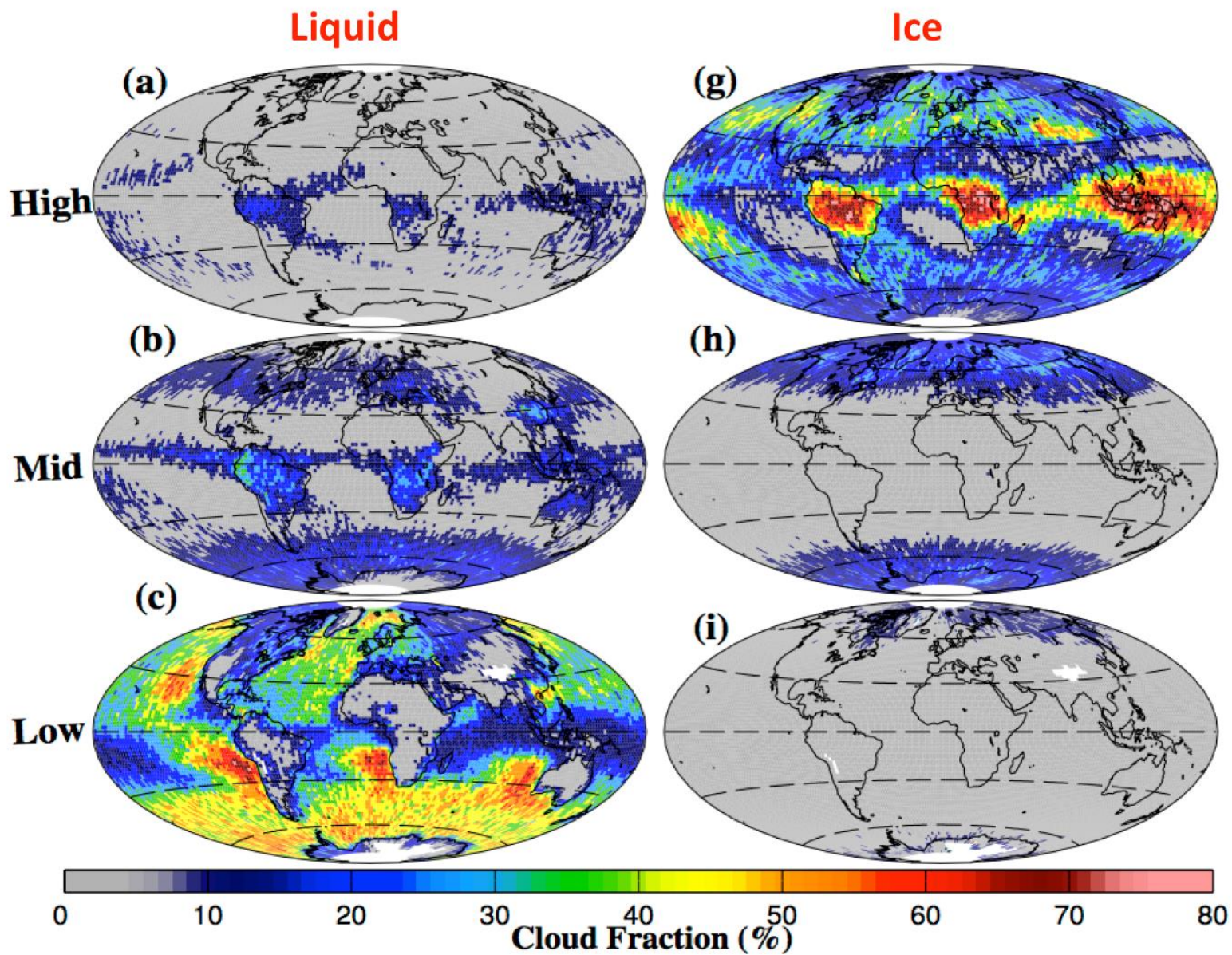


Cirro clouds: ice crystals;
Alto clouds: supercooled
water droplets

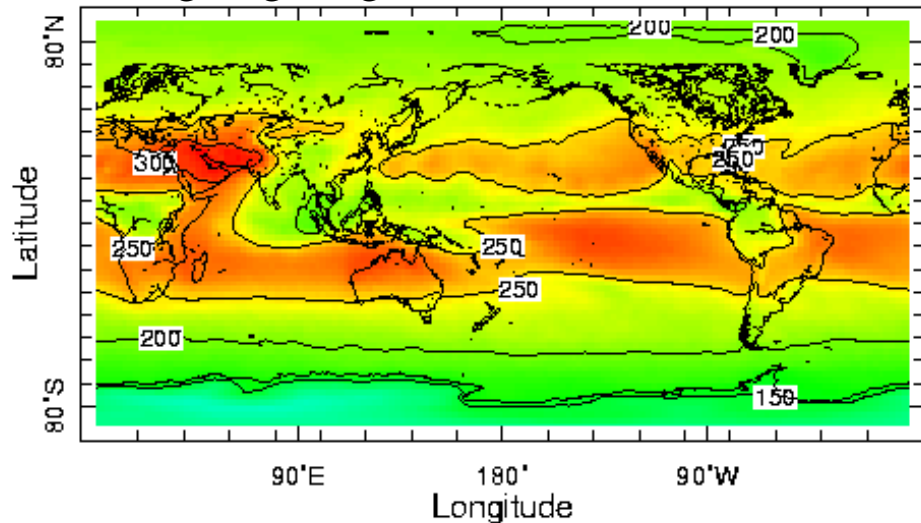
Strato implies layering,
indicative of stable conditions
(w 0.1-1 m/sec);

Cumulus means “heap” or
“mass” → more unstable
conditions (w 5-50 m/s).

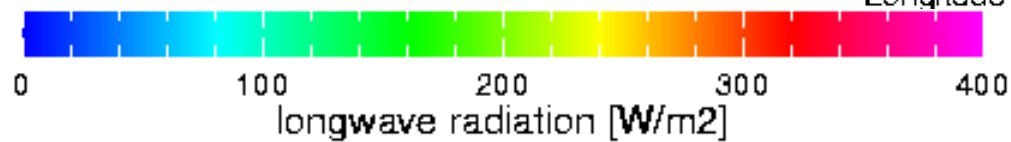
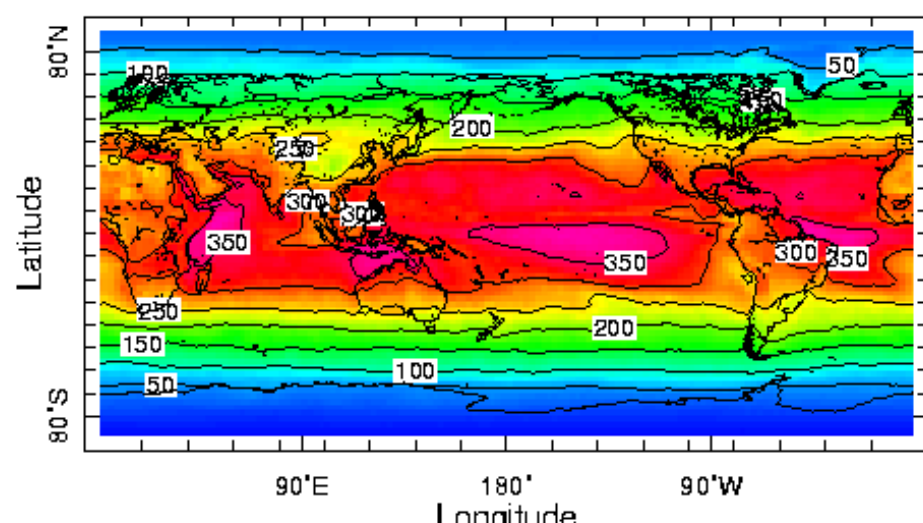
Nimbus means rain or snow
producing.



Outgoing longwave radiation (OLR)

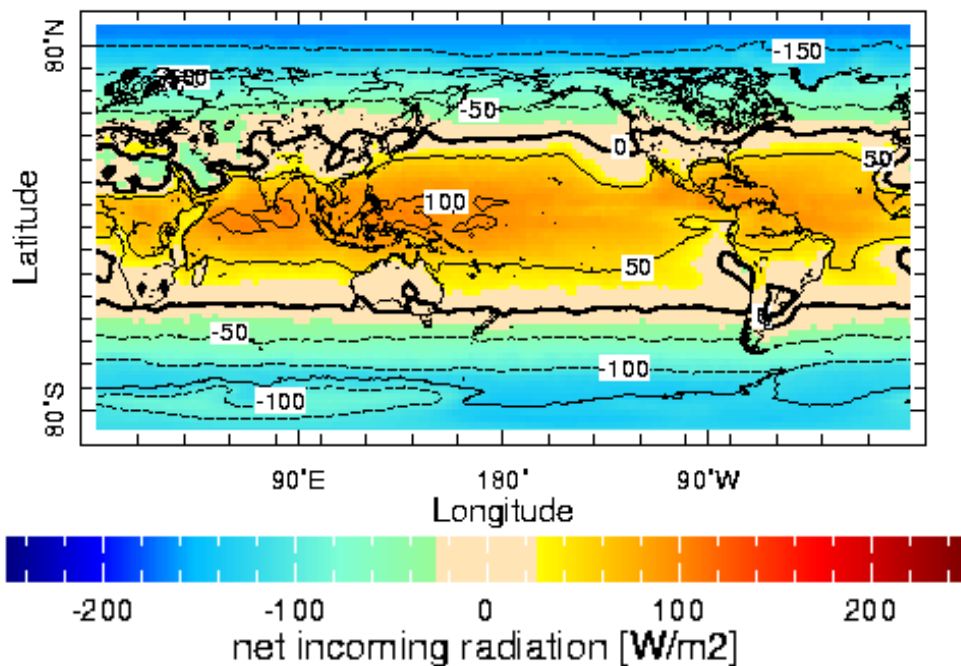


Net Shortwave (Solar) Radiation

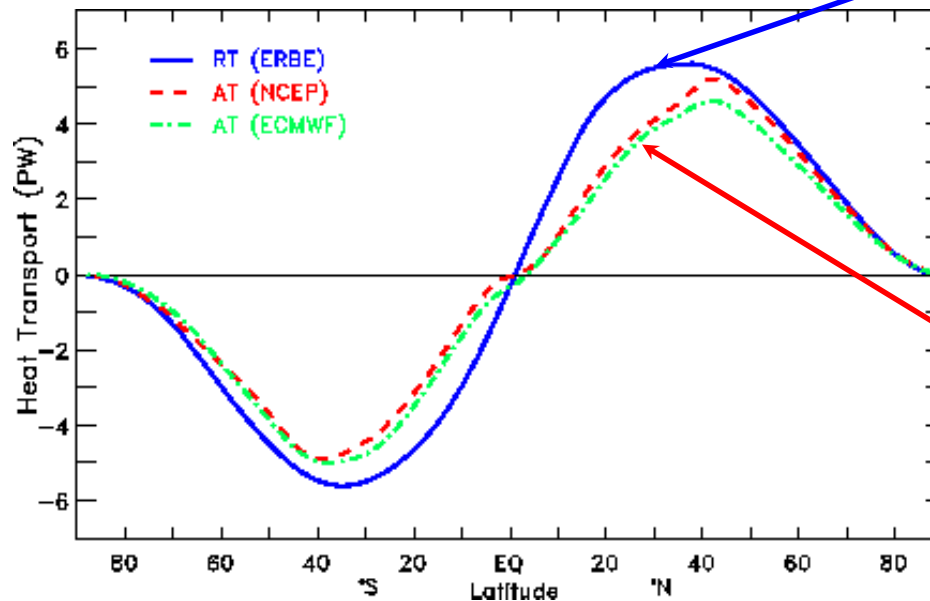
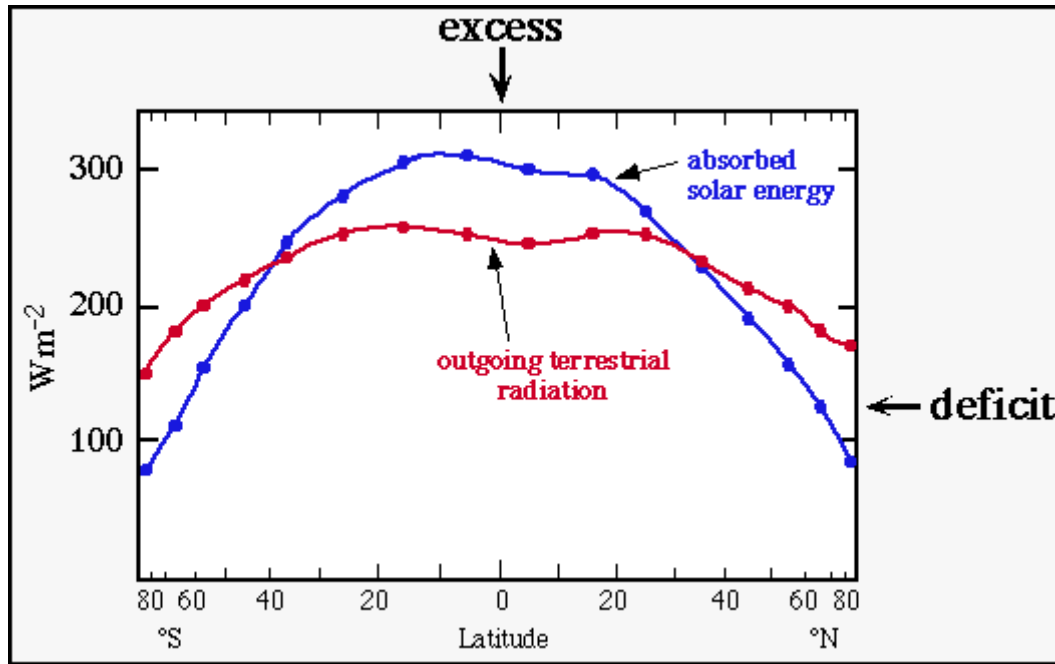


Net incoming Radiation (SW-LW)

March climatology



Latitudinal Radiation Imbalance



Total heat transport

Atmospheric heat transport

adapted from
Trenberth
and Caron
(2001)

$PW = 10^{15} W$

Meridional heat transport

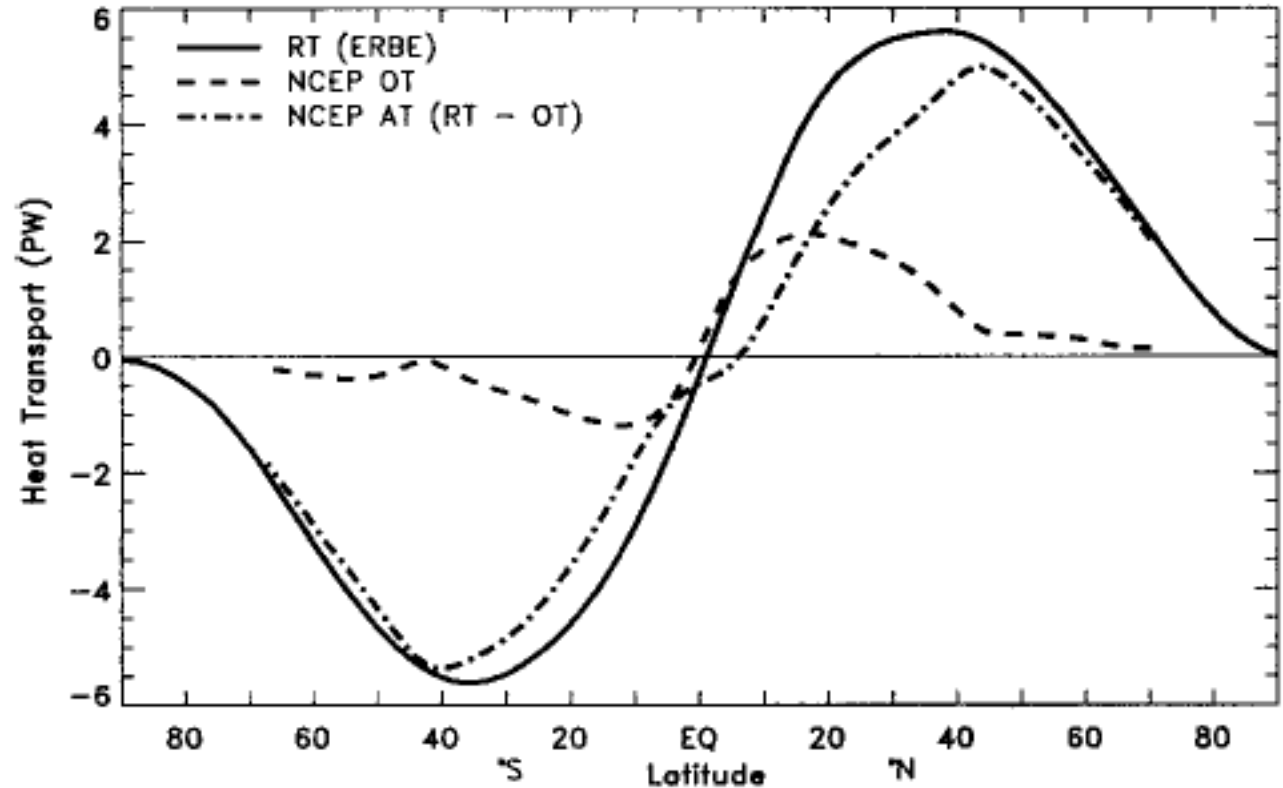
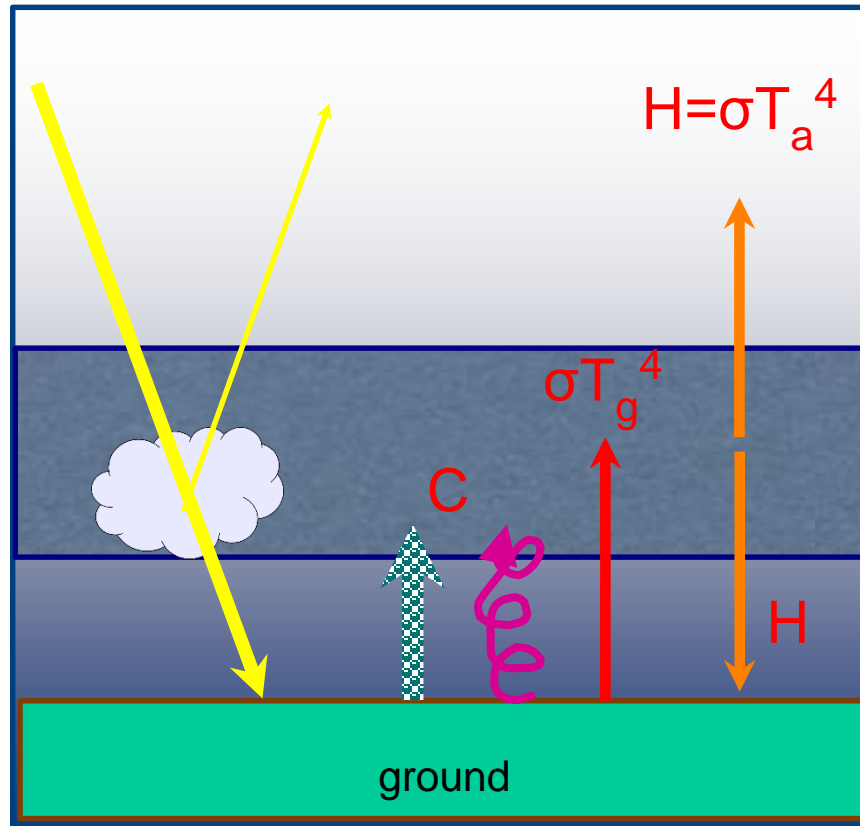


FIG. 7. The required total heat transport from the TOA radiation RT is compared with the derived estimate of the adjusted ocean heat transport OT (dashed) and implied atmospheric transport AT from NCEP reanalyses (PW).

PW= 10^{15} W

**Trenberth
and Caron
(2001)**

The surface loses heat through radiation, and latent and sensible heat fluxes.



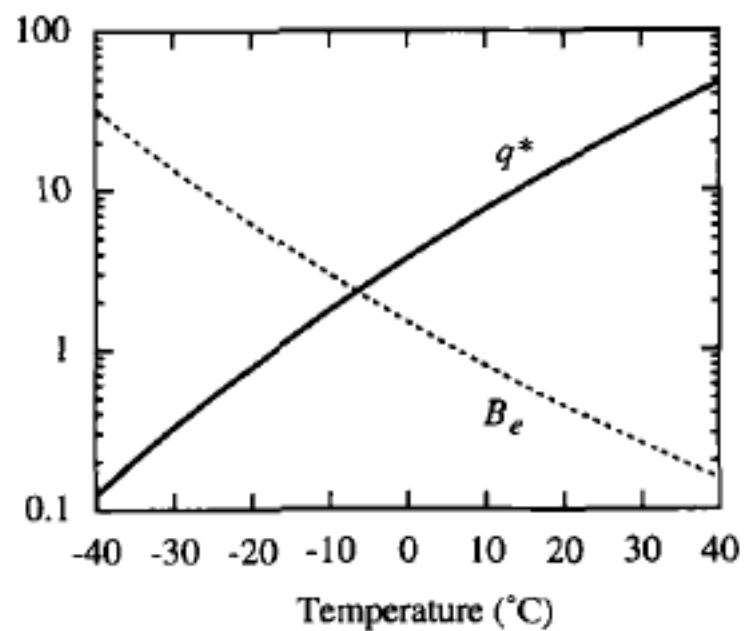
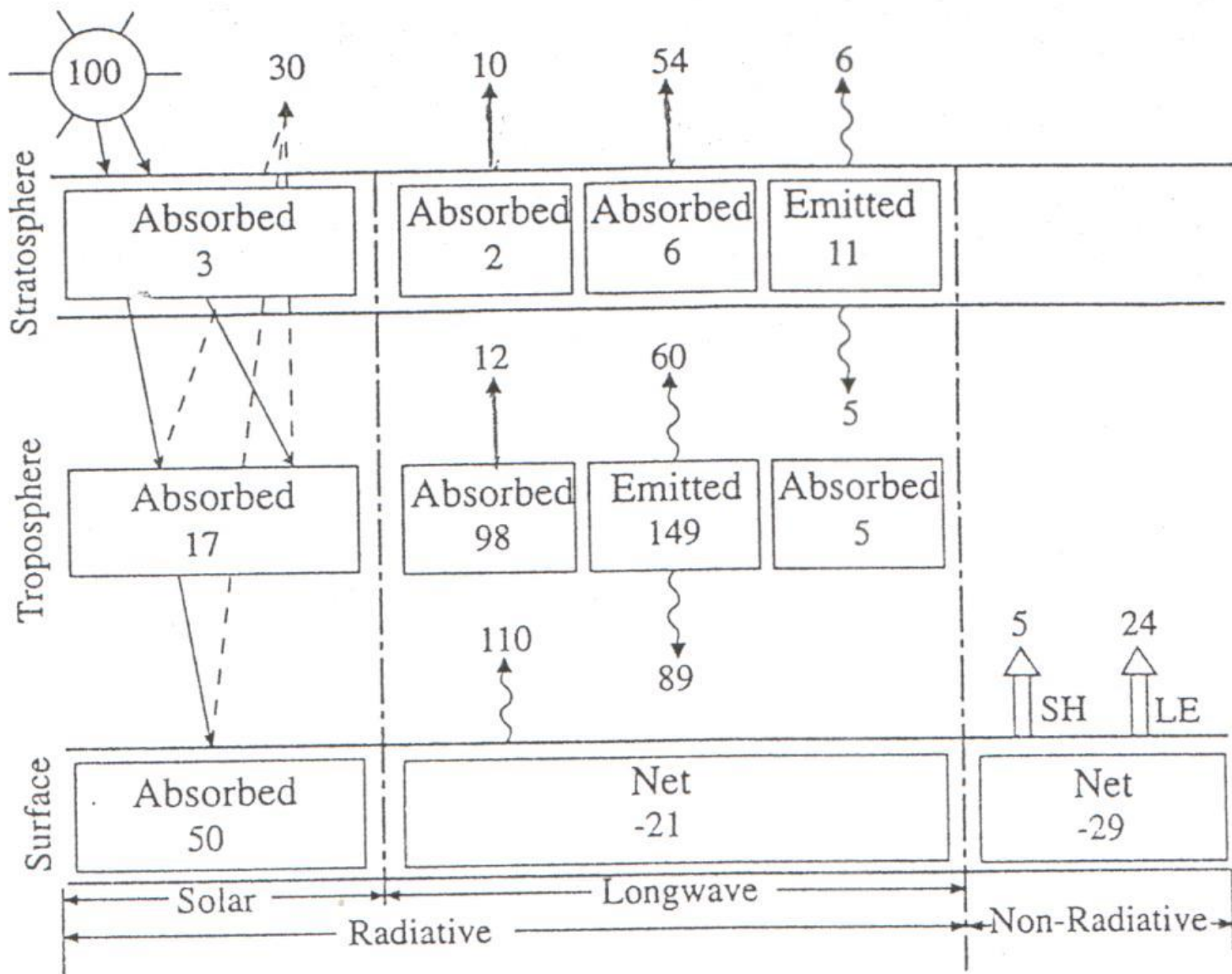



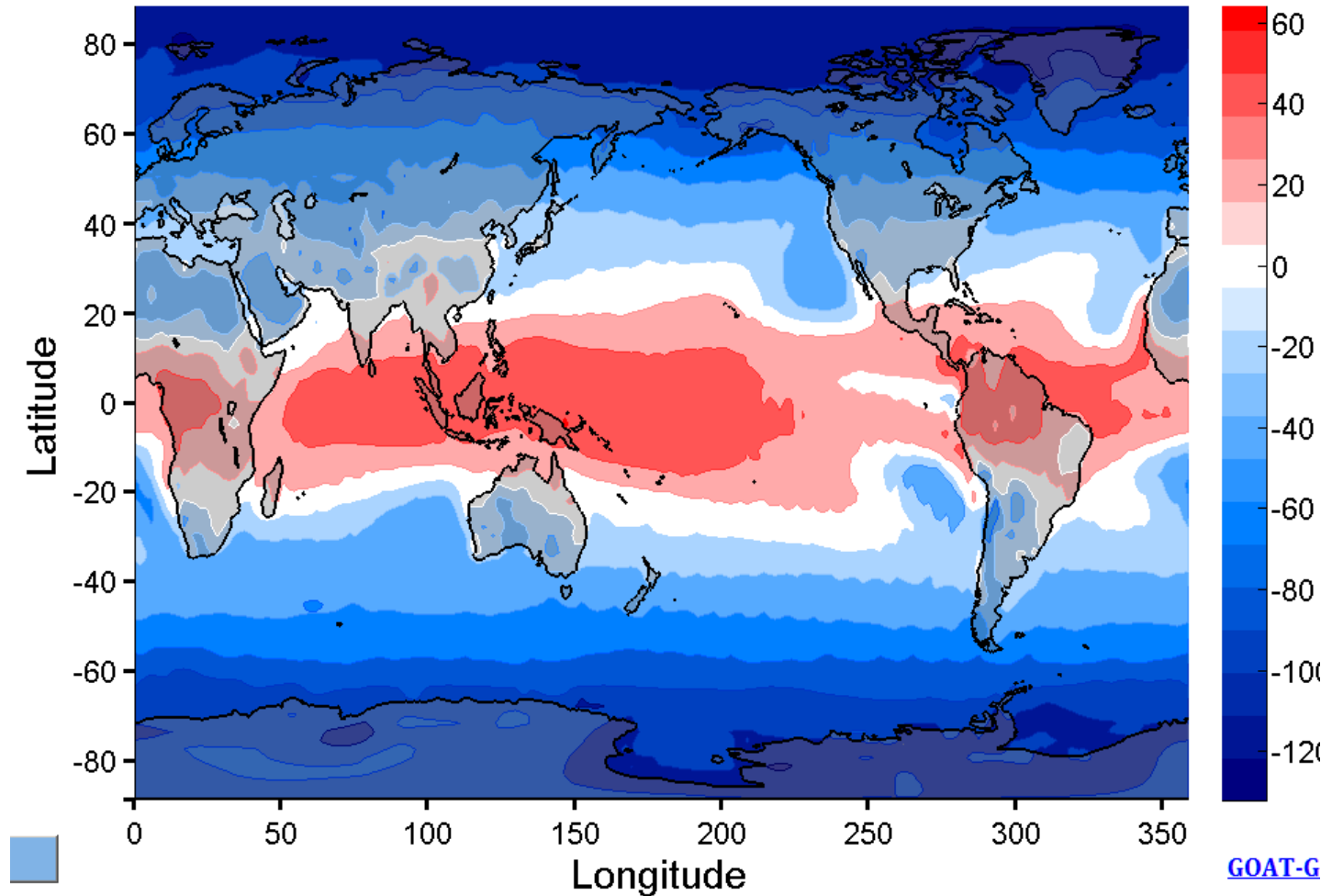
Fig. 4.10 Saturation specific humidity q^* (g kg⁻¹) and equilibrium Bowen ratio B_e , as functions of temperature.



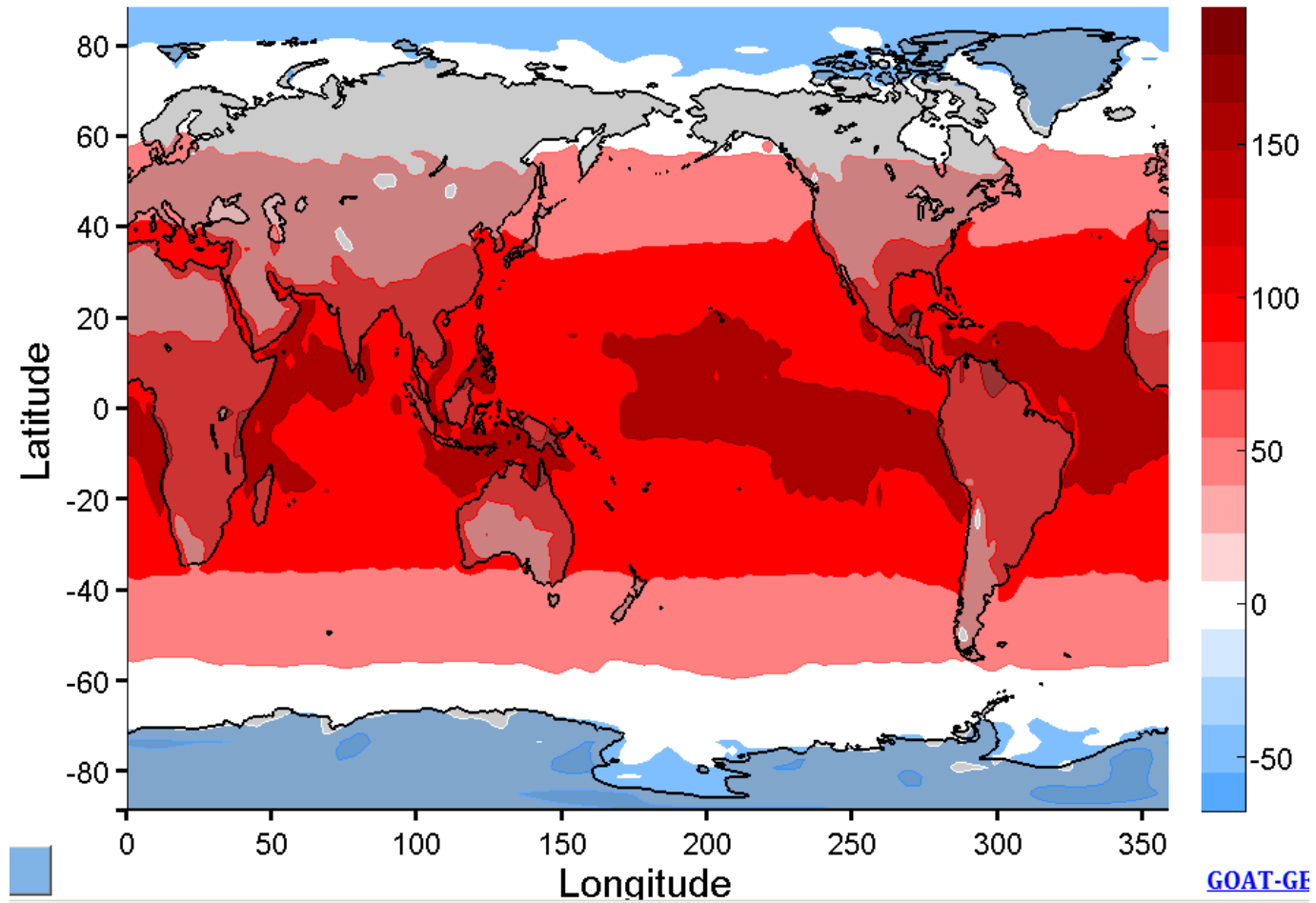
The screenshot shows a web browser window with the following elements:

- Browser Menu:** File, Edit, View, History, Bookmarks, Tools, Help.
- Tab:** Downloads | GOAT Homepage
- Address Bar:** www.goat-geo.org/downloads/
- Search Bar:** Search for 'ori goat'.
- Navigation Icons:** Back, Forward, Home, Reload, and a red 'ABP' (AdBlock Plus) icon.
- Page Content:**
 - GOAT Homepage** (Main heading)
 - Geophysical Observations Analysis Tool by Ori Adam
 - Navigation Menu:** HOME, **DOWNLOADS**, OPENDAP AND CMIP5, INSTRUCTIONAL, CONTACT
 - Downloads Section:**
 - Latest Version** (Section heading)
 - 
 - Version 2015C03. Updated Mar.03.2015.
 - [Download Now!](#) (button)
 - 508 Downloads (text)

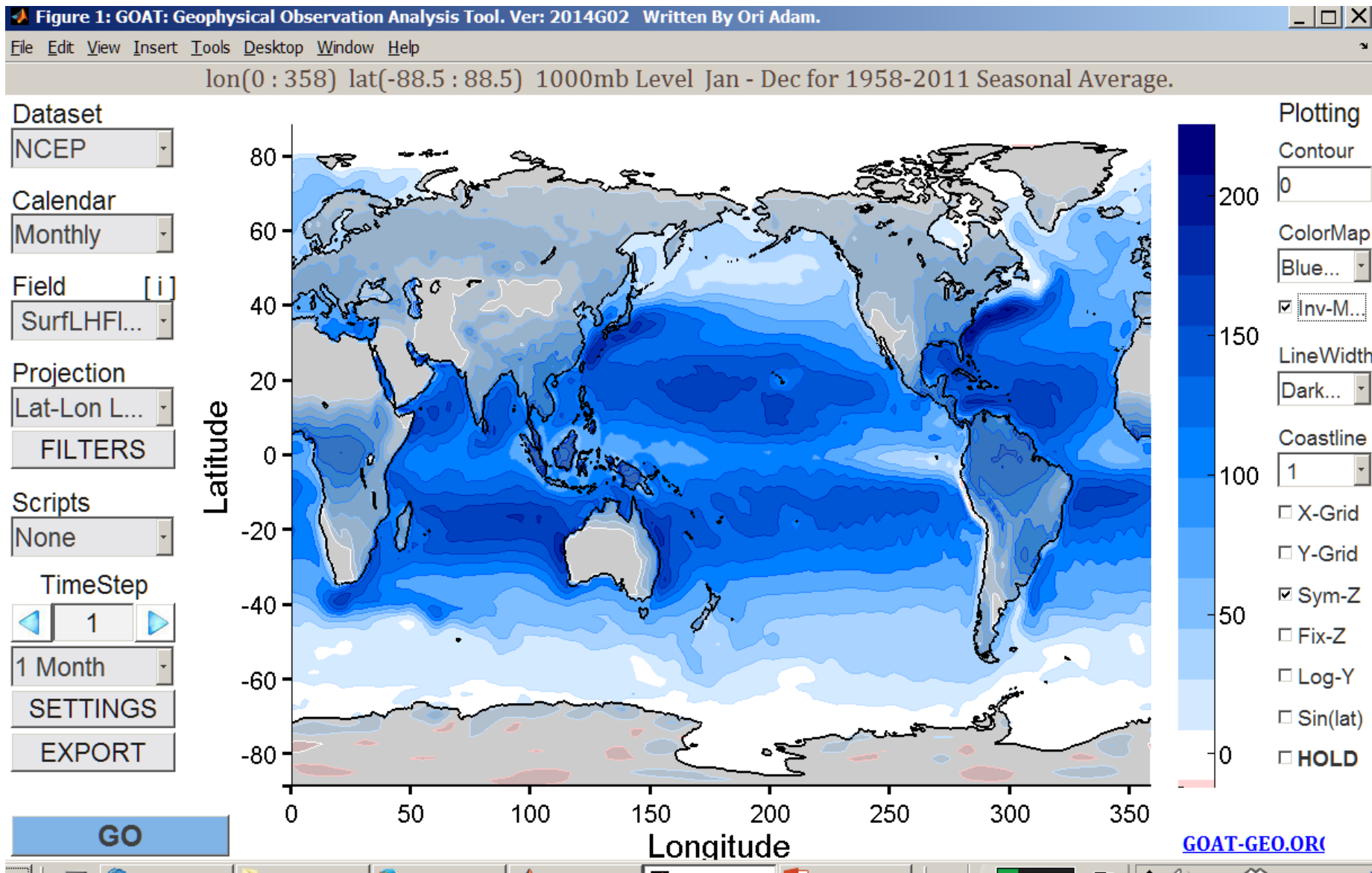
Annual mean net downward radiation at the top of the atmosphere, 2002-2011 (Watt/m²)



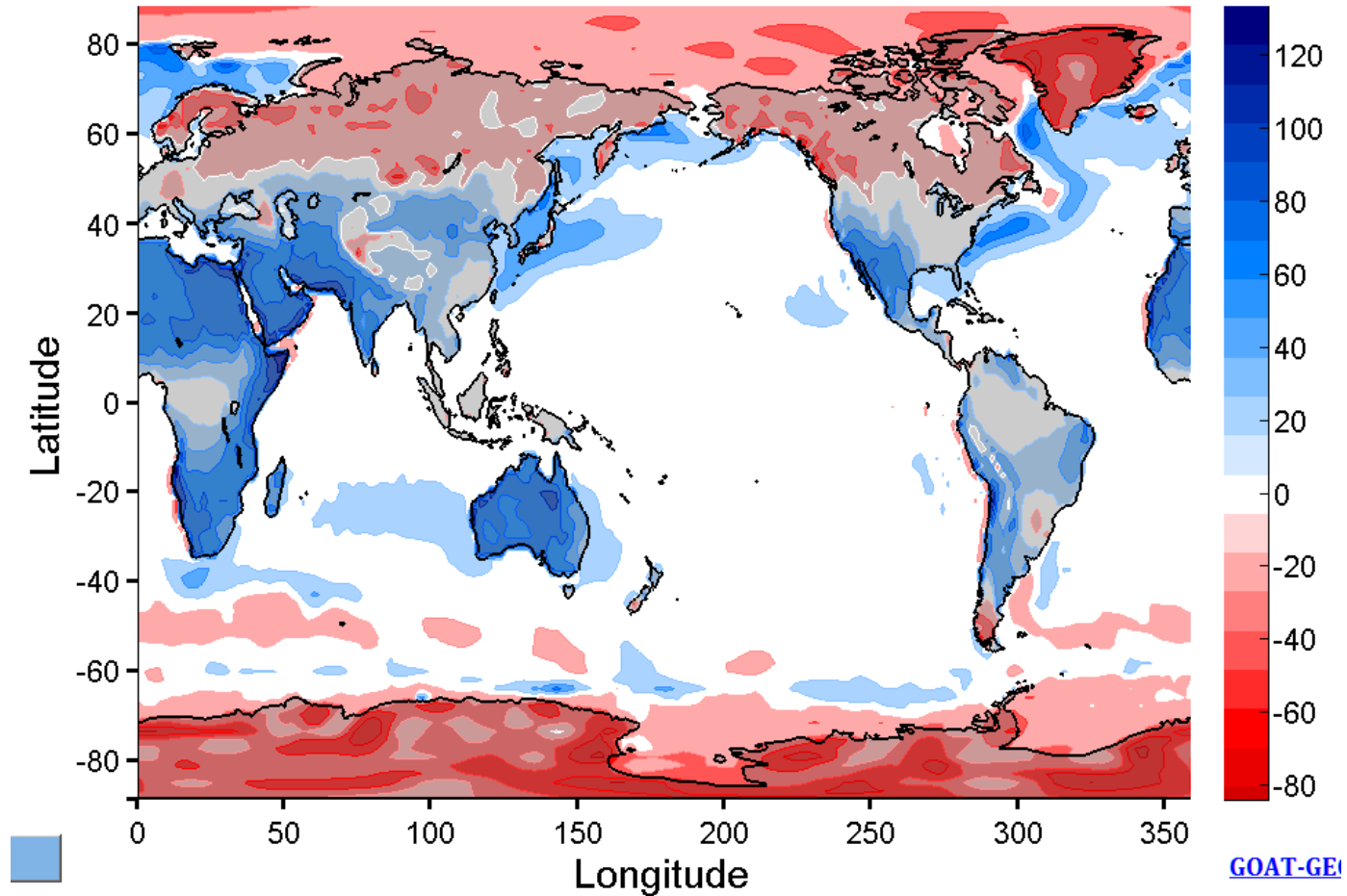
Annual mean net downward radiation at the surface, 2002-2011 (Watt/m²)



Annual mean net upward latent heat flux (blue is up) at the surface, 1958-2011 (Watt/m²)



Annual mean net upward sensible heat flux (blue is up) at the surface, 1958-2011 (Watt/m²)



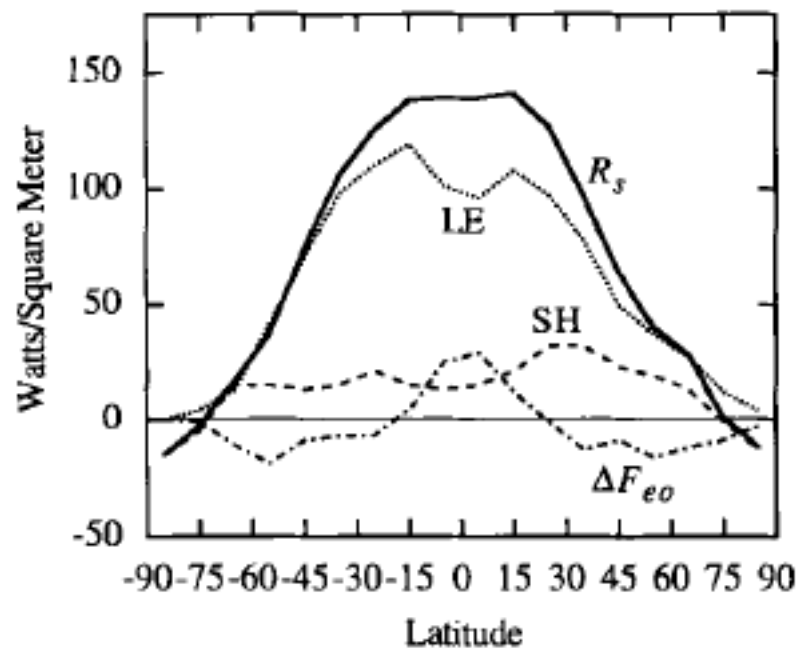
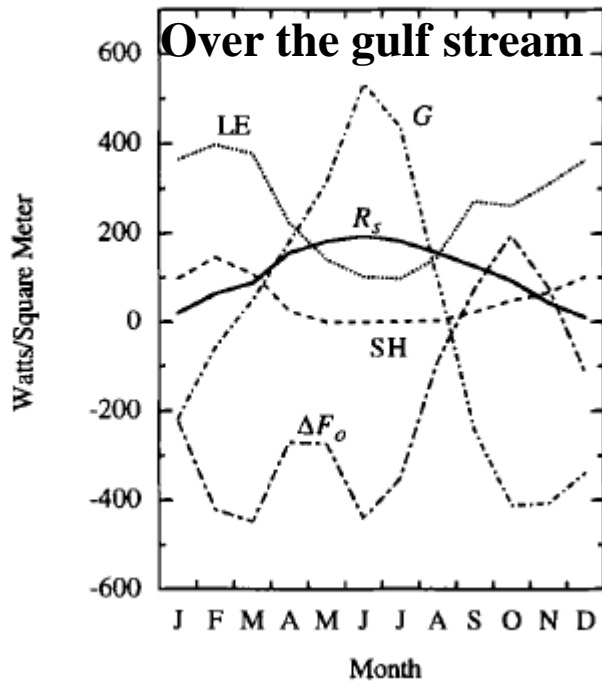
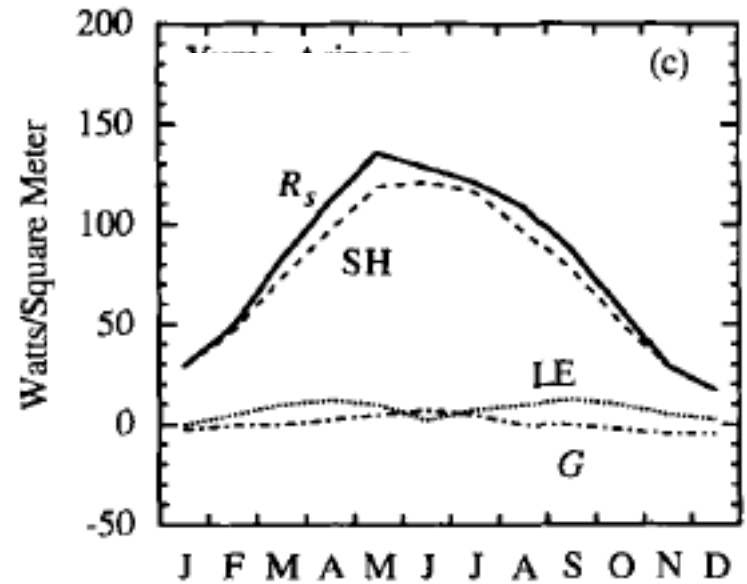
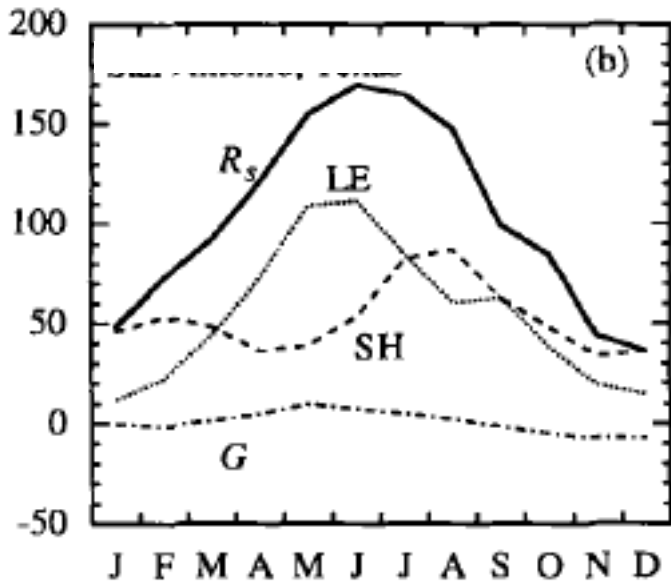
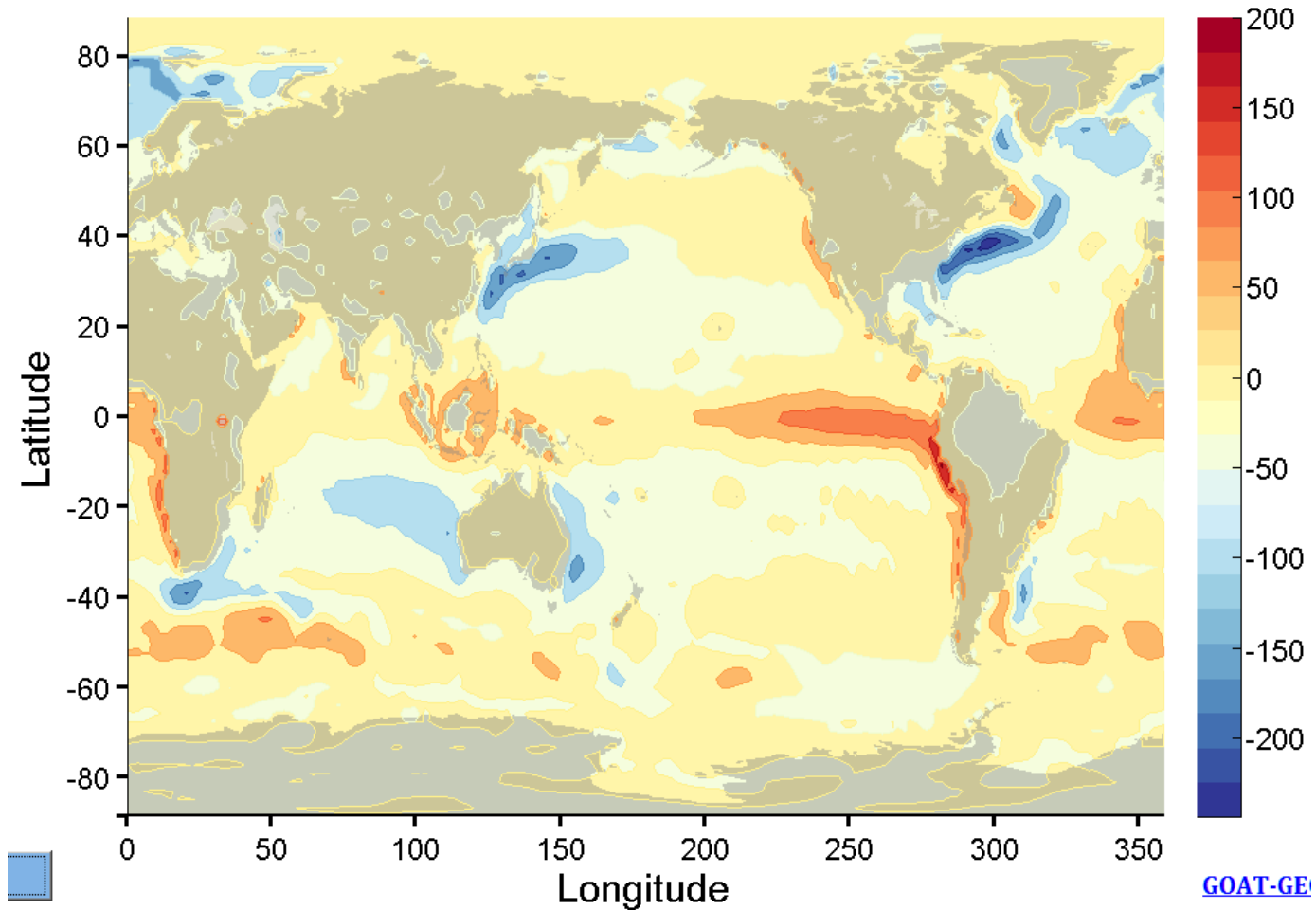


Fig. 4.11 Components of the annual-average surface energy balance plotted against latitude. [Data from Sellers (1965). Reprinted with permission from the University of Chicago Press.]



Which is over land and which over ocean? Which over desert?

Annual mean net downward heat flux (red is down, blue is up) at the surface, 2002-2011 (Watt/m²)



ליבשות יש קיבול חום קטן יותר לכן שנויי הטמפרטורה גדולים יותר מאשר בים

