

Ocean 423

Exercise #2: Atmospheric Circulation, Due Tuesday April 21

Download the file `heat.mat` from the assignments page of the web site.

(1) Compute and plot the ocean meridional heat transport as a function of latitude for a hypothetical ocean basin, given the data values in this file for:

lat = Latitude (in degrees)

L = Ocean width at the corresponding latitude (in degrees longitude)

Q = Zonally-averaged heat flux at that latitude (in Watts/meter squared). Positive values indicate a heat flux from the atmosphere into the ocean.

A couple things to remember to get you going.

- a) A degree of latitude is about 111 km
- b) A degree of longitude is about $111\text{km} \cdot \cos(\text{latitude})$

We will go over a few simple matlab commands in class.

You should compare your plot against those found in lecture 1.

You will want the command `cumsum` in matlab which plots the cumulative sum of a vector.

(2) Where is the meridional heat transport by the ocean maximum?

(3) Assume that the heat flux values may be in error by $\pm 10 \text{ W/m}^2$. Estimate and plot the potential error in meridional heat transport as a function of latitude.