Project 1, AT605

At the website

http://kiwi.atmos.colostate.edu/group/dave/at605.html,

near the bottom of the page, you will find a link to data for the observed zonal and meridional wind components for March 1998. These are based on ECMWF analysis. The data are available every six hours. The total amount of data is about 10 MB. You will also find a Fortran program to read the data.

a) Using

\[
\langle uv \rangle = \langle u \rangle \langle v \rangle + \langle u'v^* \rangle + \langle u^*v' \rangle + \langle u'^*v'^* \rangle
\]  

compute the four “components” of the zonally averaged meridional flux of zonal momentum at each latitude. Label your plots clearly.

b) Also compute the left-hand side of (1) directly, and confirm by comparing the numbers that the sum of the terms on the right-hand side is in fact equal to the expression on the left-hand side, apart from very small differences that arise from round-off error in the computer.

c) Discuss the relative magnitudes of the various terms on the right-hand side of (1), as functions of latitude.

You may start from the program given, or if you prefer you may write your own program, using any programming language. You are also free to choose any plotting software.

The instructor and TA will be happy to give you help and advice but we will not debug your programs for you.

If you have practical problems doing the assignment, e.g., you do not have access to a computer or you do not have access to suitable plotting software, please see the instructor for help.