Homework.

For all the following use the monthly mean netcdf file for 2020 that we downloaded in the lab class.

1. Make a map of high cloud cover averaged for all 2020. In the tropical band (20S to 20N) where are the high clouds found? What kind of rain systems are these associated with?
2. Now do the same for low cloud (LCC) where are the maxima found in the zone 30S to 30N? what kind of clouds are these? Why are they found where they are?
3. Make a **zonal mean** plot of precipitation for all 2020. You will notice it has 4 distinct peaks, two broad ones at around 50 degrees latitude in each hemisphere, and two sharper peaks in the tropics either side of the equator. Explain what kind of weather system the tropical and midlatitude peaks are associated with?
4. Calculate the average latent heat flux **separately** over land and over ocean for the band 30S to 30N in $Wm^{-2.}$ Is the flux higher over land or over ocean? Why?
5. Plot the range of the annual cycle for the two metre temperature (T2m) (i.e. the maximum month minus the minimum for each grid point. For a given latitude, is the annual range largest overland or ocean? Why?
6. Optional: for the tropics (20S to 20N) make a plot of precipitation as a function of SST. At what temperature does rainfall start to increase? Can you think why this might be?