

## Assignment 5

Give a short answer to the following 5 questions

### **Problem 12.5. Influence of Obliquity angle**

How, do you think, does the zonal mean state of the atmosphere (temperature, zonal wind and Hadley circulation) change if both obliquity,  $\delta_{\max}$  (**Box 2.1**) and  $\phi_{\max}$  are equal to  $55^\circ$ ?

### **Problem 12.6. Influence of precipitation in the ITCZ**

How would the zonal mean state of the atmosphere be affected if we would decrease the fraction,  $f_{\text{locprec}}$  of the evaporation that is converted to local precipitation from 0.8 to 0.7?

### **Problem 12.7. Influence of the height of cloud tops in the ITCZ**

In the model simulations, which are discussed in this chapter, the pressure of the cloud tops ( $p_{ct}$ ) in the ITCZ lies is set at 200 hPa (eq. 12.30 and **Table 12.2**). How realistic is this? How would the Hadley circulation, the subtropical jet and the tropopause change if the cloud top pressure in the ITCZ were set at 50 hPa?

See next slide

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### **Problem 12.8. Influence of Earth's rotation rate**

How would the Hadley circulation and the zonal mean zonal jets be affected if we would double the value of the Coriolis parameter.

### **Problem 12.9. Influence of zonal asymmetry in wave drag**

Planetary wave activity is much stronger in the northern hemisphere than in the southern hemisphere, and also probably more variable in the northern hemisphere. What is the influence of this asymmetry on the zonal mean state of the atmosphere in terms of (potential) temperature and zonal mean zonal wind?

Hand in answer on or before 4 June 2014