

Some notes from last time: fronts

high sfc pressure

low sfc pressure

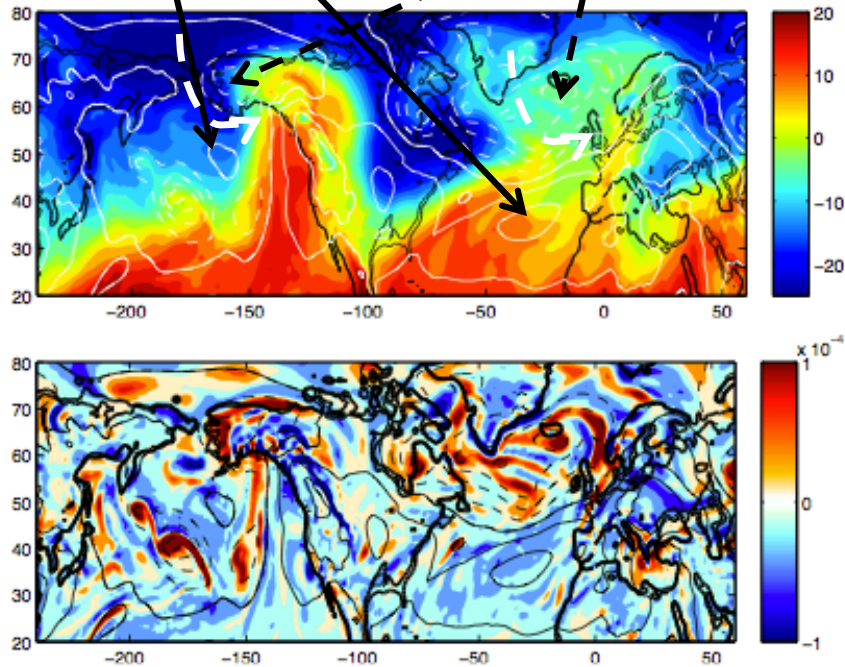


Figure 2 : En couleur: champ de température (en °C) à 850 hPa. En tirets, pression au niveau de la mer inférieure à 1013 hPa; en continu, supérieure à 1013 hPa. Figure 3 : en couleur, vorticité relative à 850 hPa.

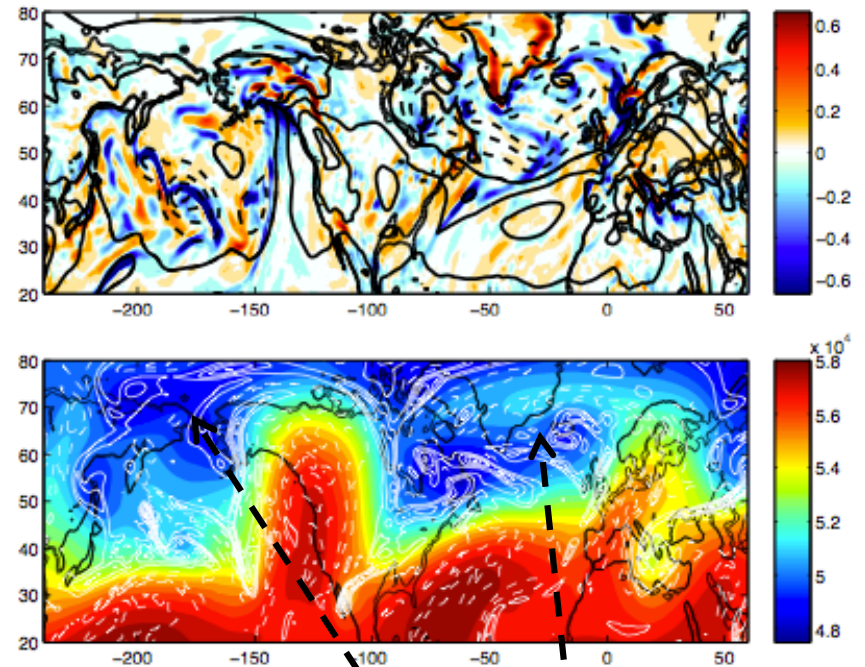


Figure 4 : en couleur, vitesse verticale (en hPa/s) à 850 hPa. Même situation météorologique que figures 2 et 3. Figure 5 : en couleur, géopotential (couleurs) et vorticité relative (contours blancs continus pour positive et en tirets pour négative) à 500 hPa.

low 500 geopotential

Some notes from last time: fronts

high sfc pressure

low sfc pressure

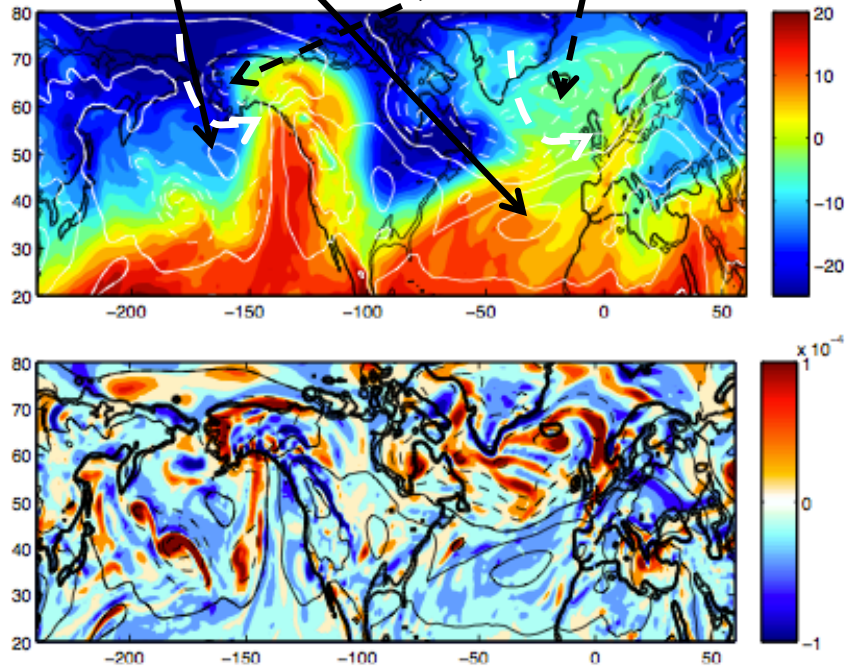


Figure 2 : En couleur: champ de température (en °C) à 850 hPa. En tirets, pression au niveau de la mer inférieure à 1013 hPa; en continu, supérieure à 1013 hPa. Figure 3 : en couleur, vorticité relative à 850 hPa.

low sfc pressure ⇔ fronts and upward motion

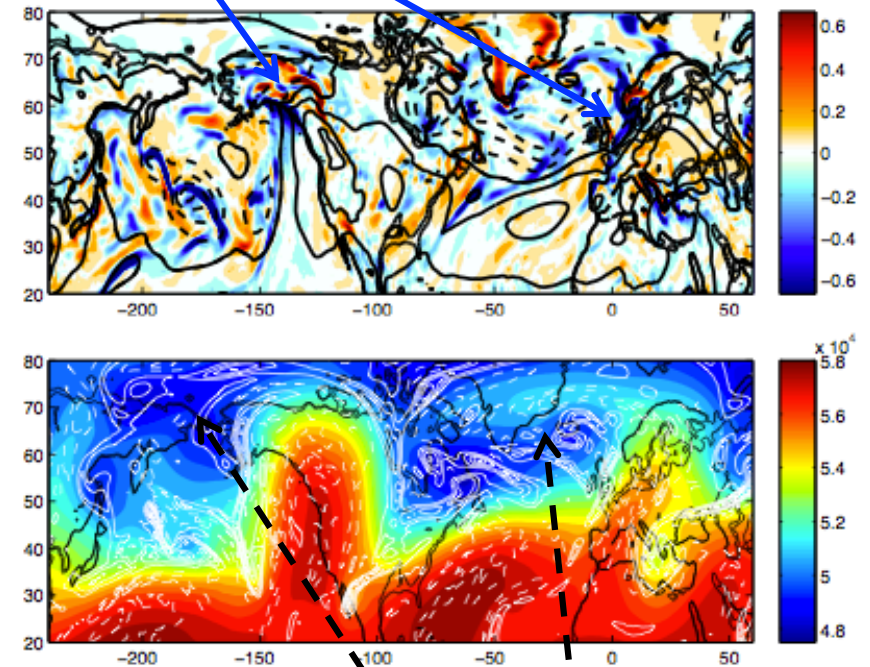


Figure 4 : en couleur, vitesse verticale (en hPa/s) à 850 hPa. Même situation météorologique que figures 2 et 3. Figure 5 : en couleur, géopotiel (couleurs) et vorticité relative (contours blancs continus pour positive et en tirets pour négative) à 500 hPa.

low 500 geopotential



Fronts:

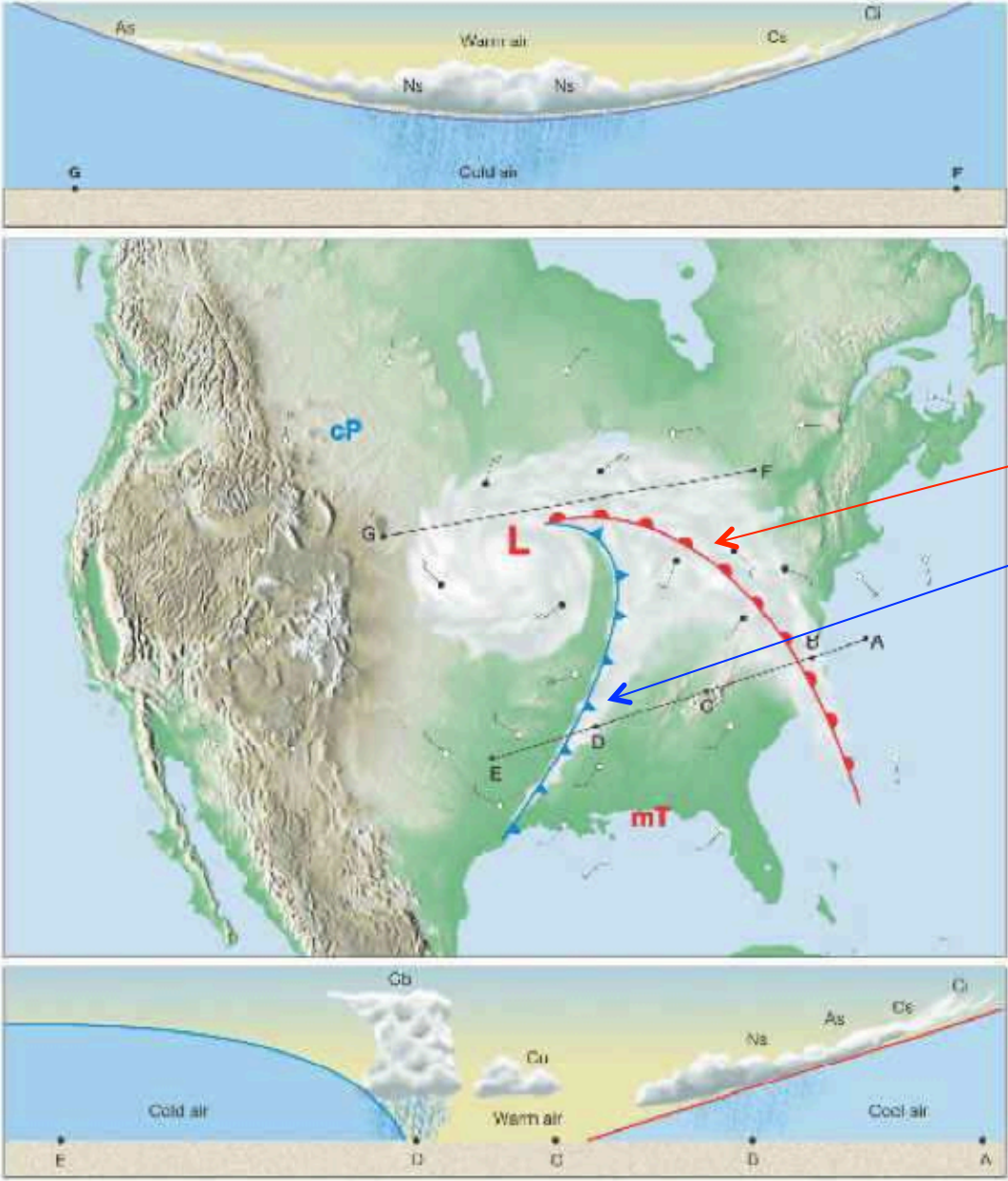


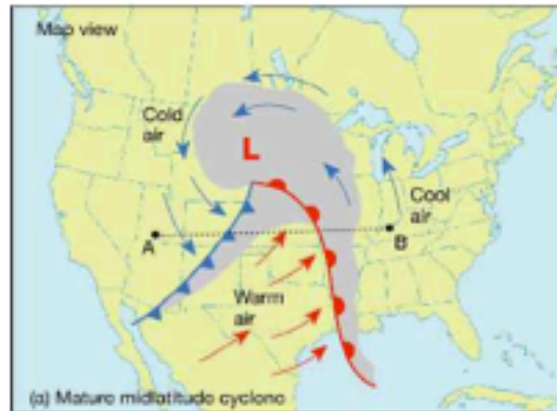
Figure 21 : représentation schématique de sections verticales à travers une dépression

warm front

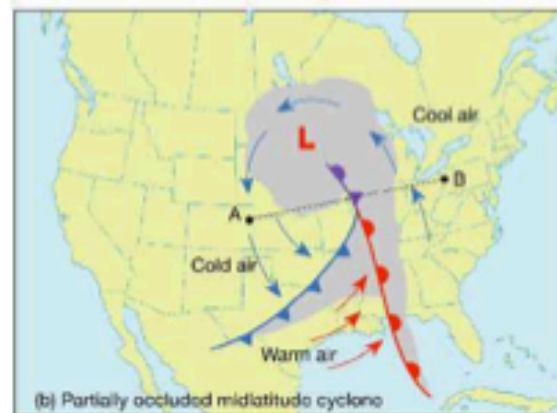
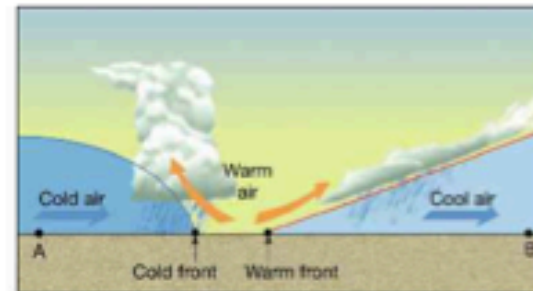
cold front
=>
steeper
faster
sharp cloudy edge



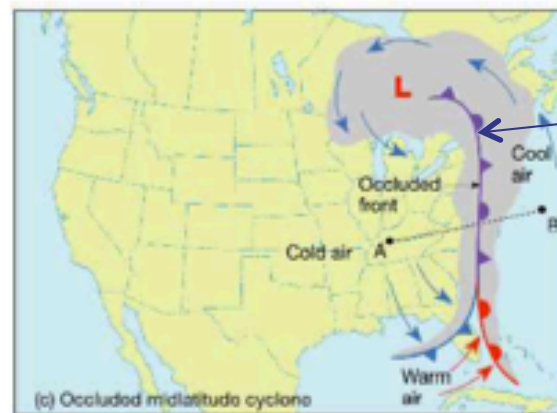
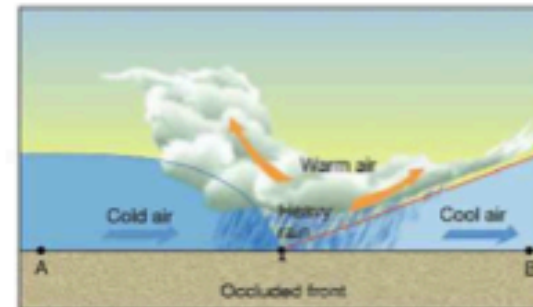
Figure 13 : photo lors d'un passage d'un front froid.



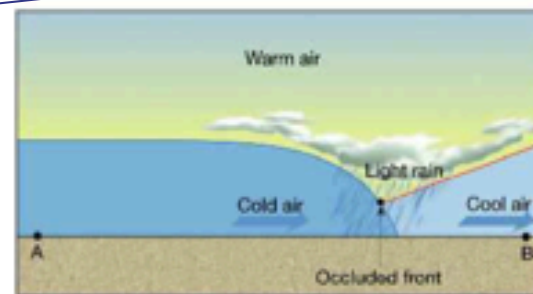
Cross sectional view



Cross sectional view



Cross sectional view



occlusion

Figure 30 : développement d'une occlusion.

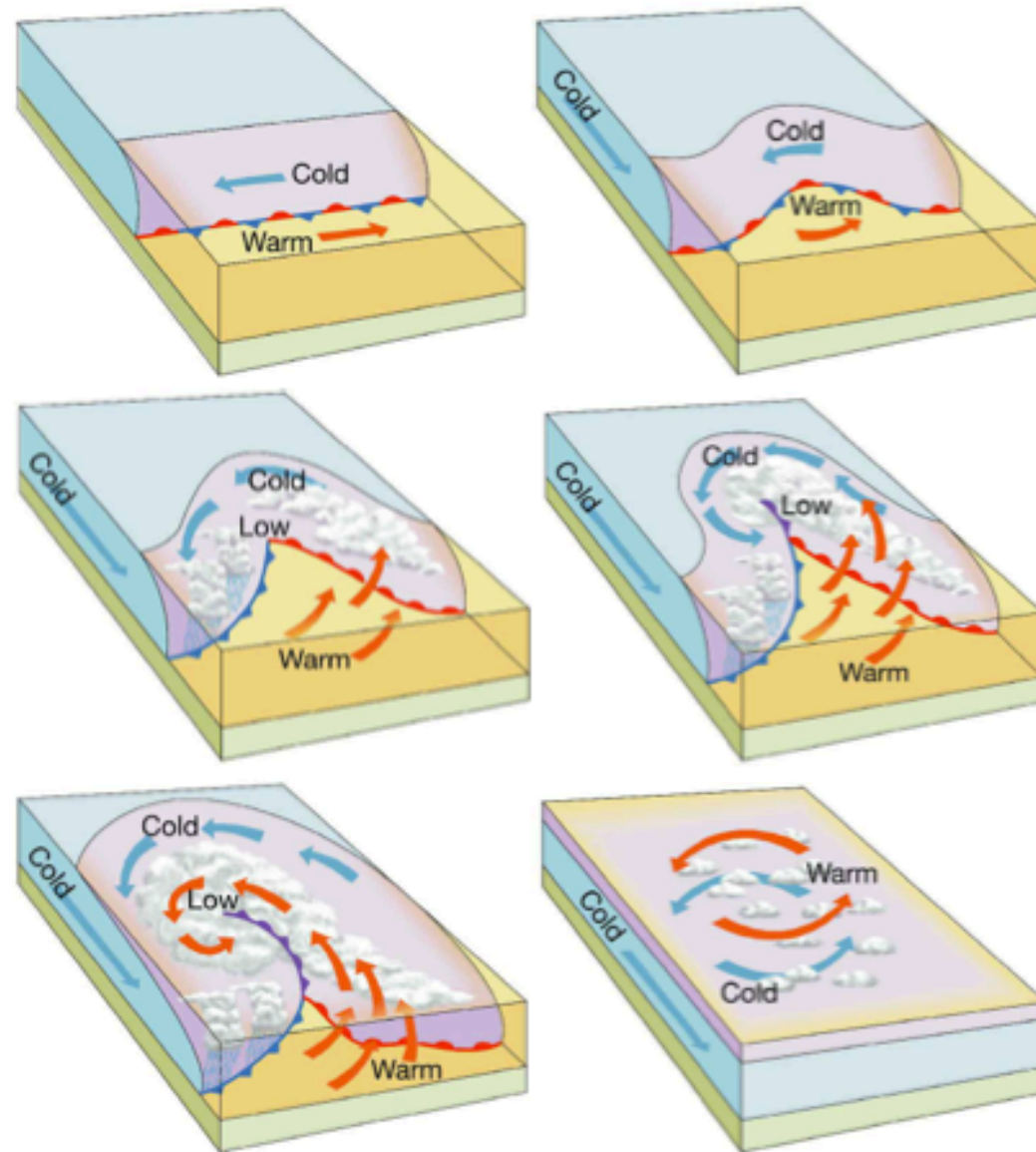


Figure 29 : schéma de développement d'une perturbation atmosphérique.

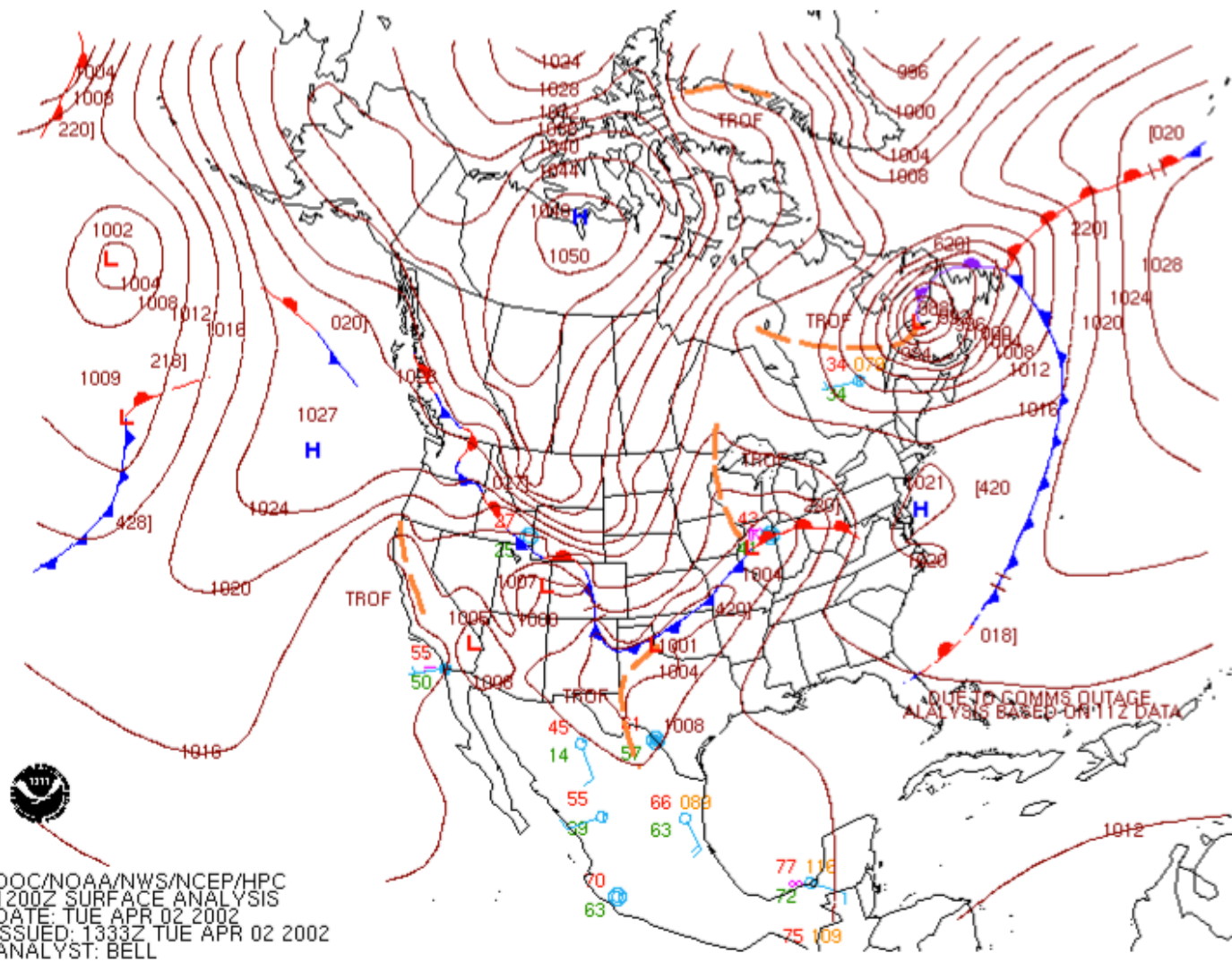
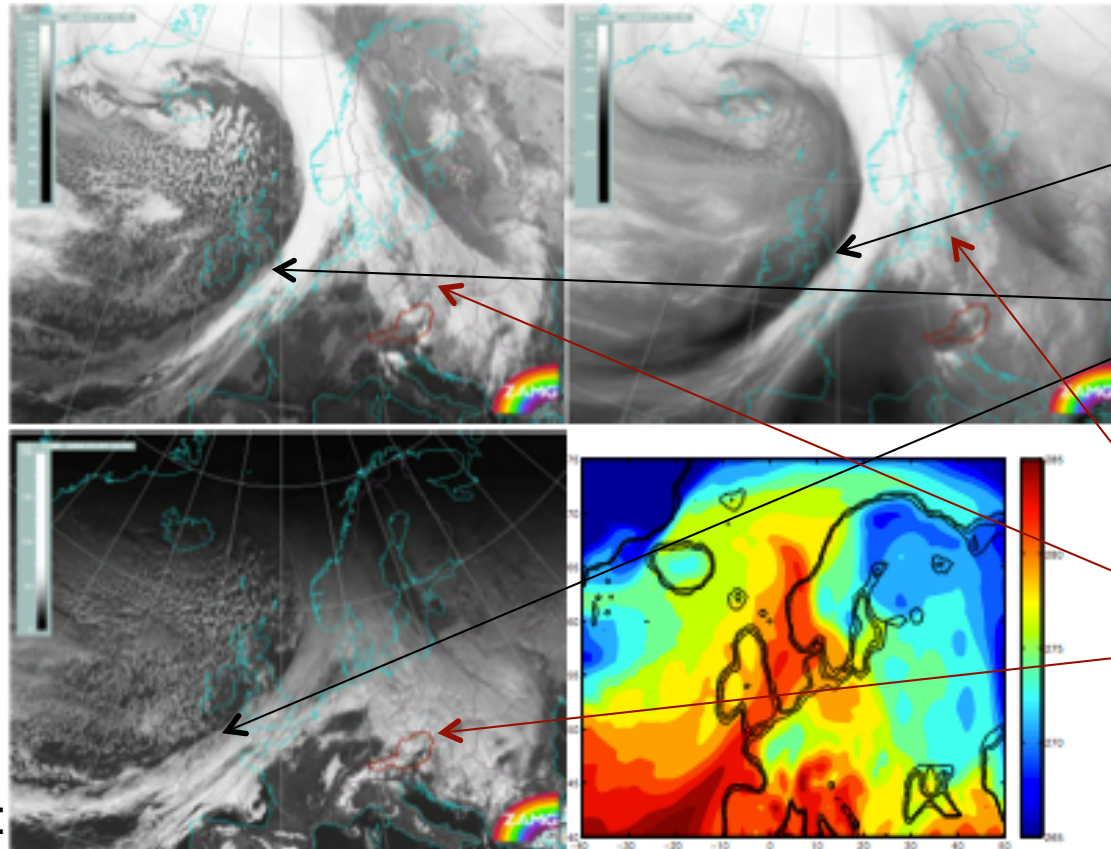


Figure 31 : exemple de carte météorologique avec fronts.

Image Satellite

IR infrarouge: T de l'objet émettant le rayonnement
faible valeur ⇔ blanc ⇔ nuages d'altitude

WV vapeur d'eau: blanc ⇔ humide



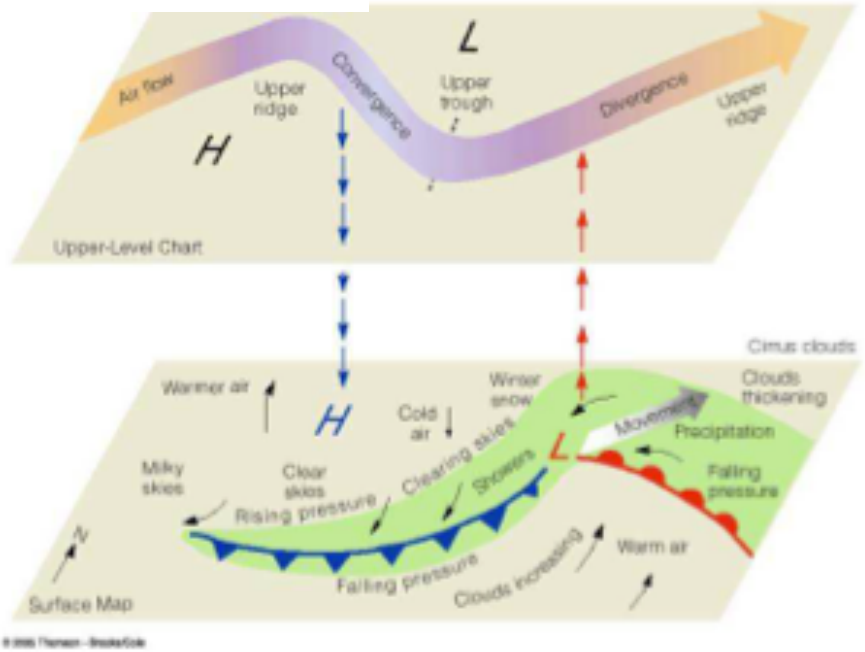
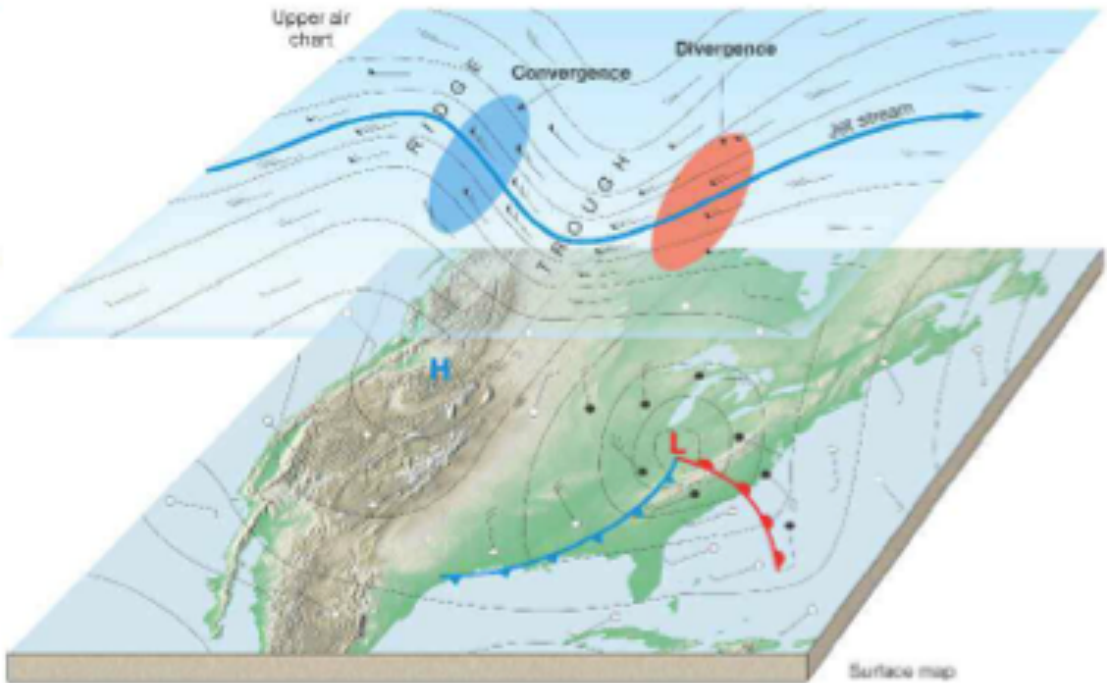
front froid:
- Air sec derriere et
humide devant
- Suivi de nuages
epais et hauts

front chaud:
- Air humide
- Nuages moins
hauts

VIS visible:
albedo
blanc ⇔ nuage epais

Figure 16 : image satellite (canal infrarouge) correspondant à un front froid et un front chaud.
Figure 17 : canal vapeur d'eau. Figure 18 : canal visible.

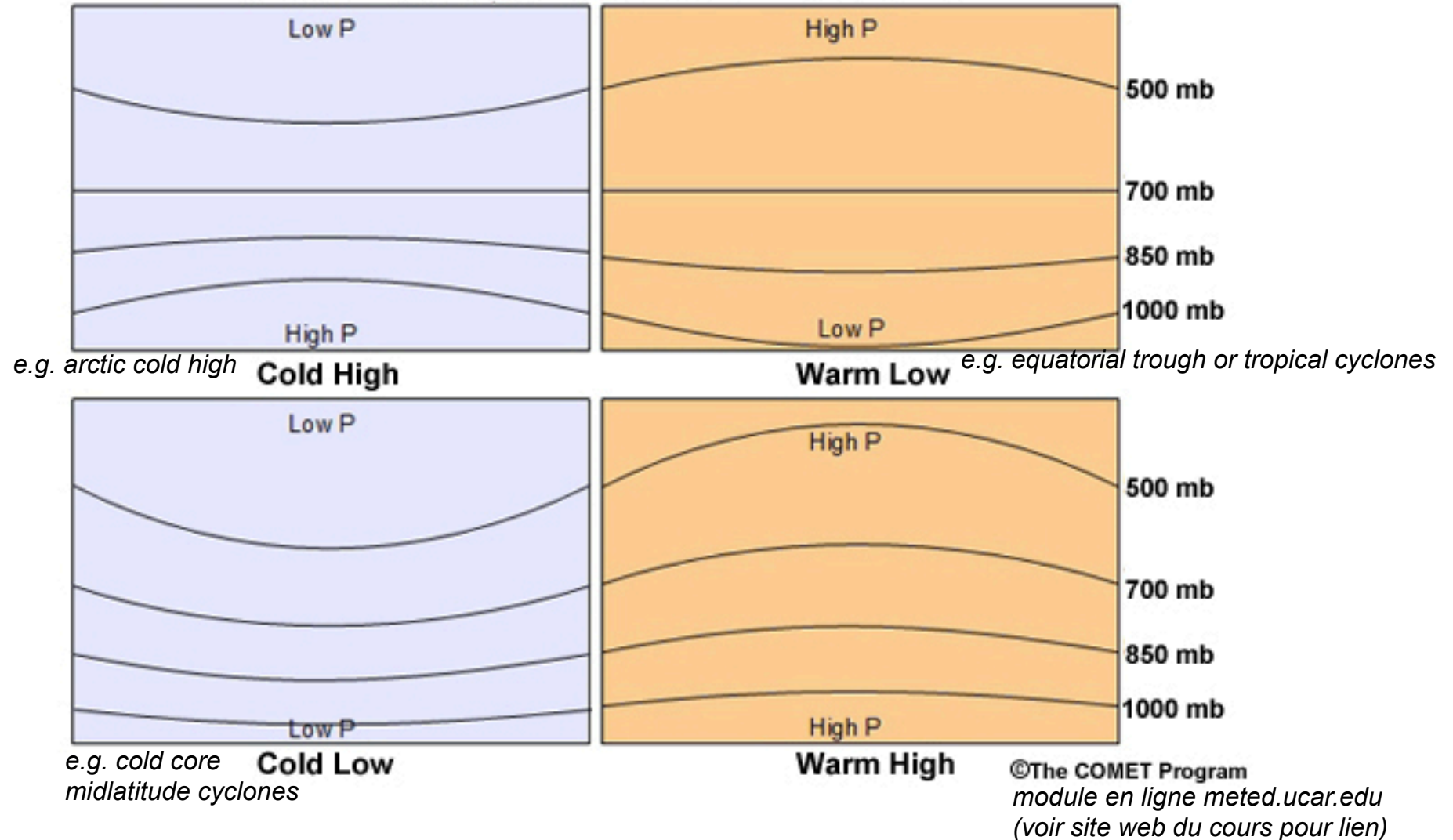
Structure verticale



Figures 3 : représentation schématique du développement des perturbations atmosphériques

Remarque 1: sur la structure verticale des systèmes hautes/basses pression

Schematic Cross Sections Showing Relationship Between Surface Pressure, Temperature, and Pressure Aloft

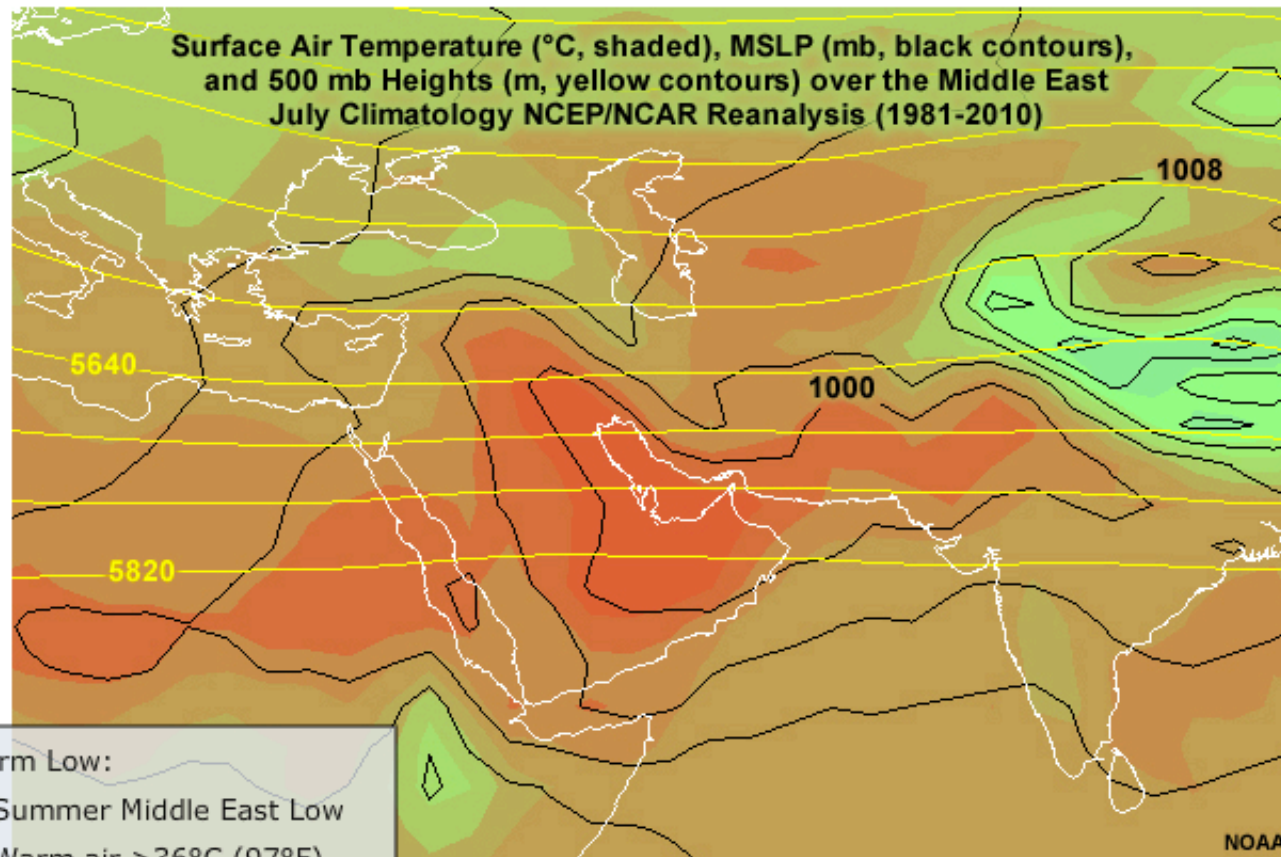


- ⇒ Not always same signal at the surface and at 500mb.
- ⇒ Depends on T, latitude...

Warm Low

Download

0:34 | 0:35



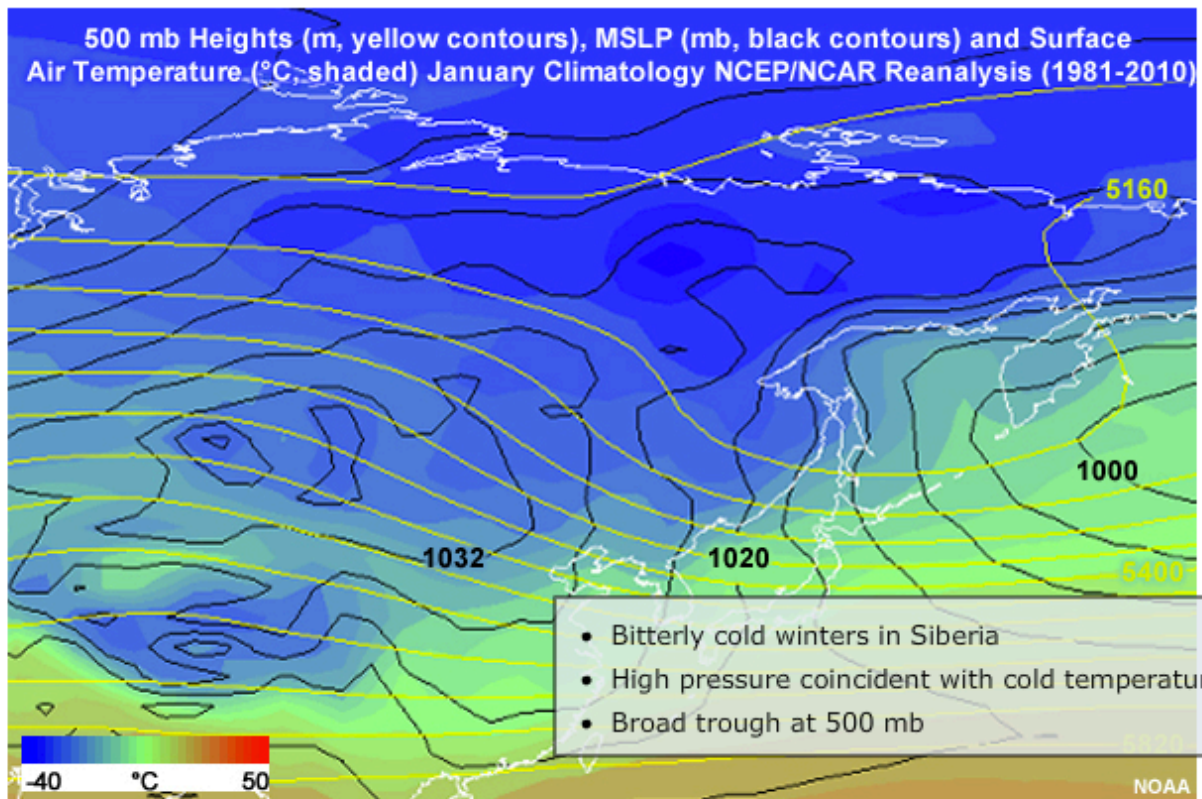
Warm Low:

- Summer Middle East Low
- Warm air $>36^{\circ}\text{C}$ (97°F)
- Barely a ripple at 500 mb

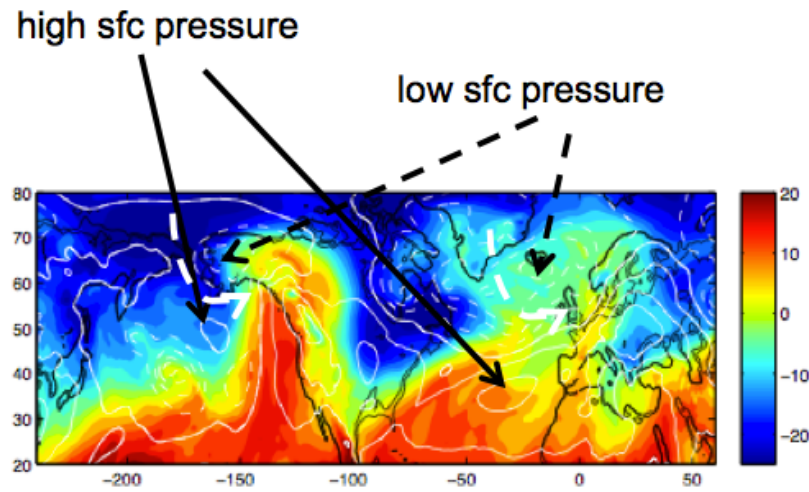
Cold High

Download

0:24 | 0:24



Remarque 2: sur les hautes pressions stationnaires sur océan



Geopotential height at 1000hPa: JJA

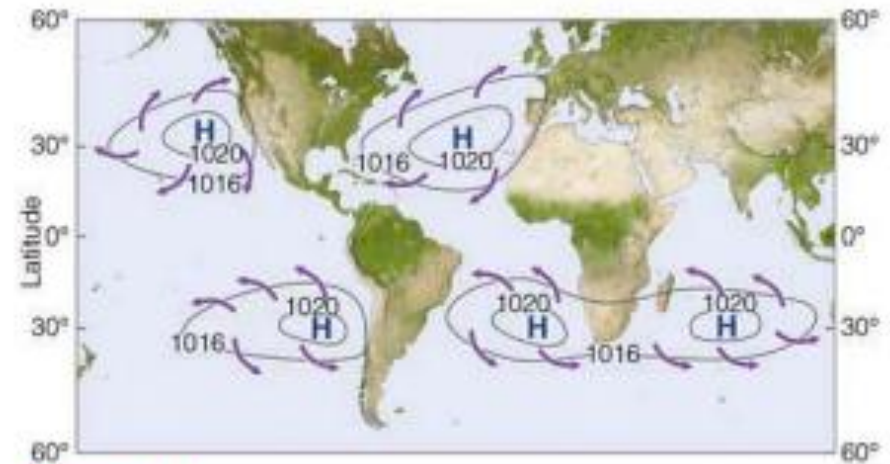
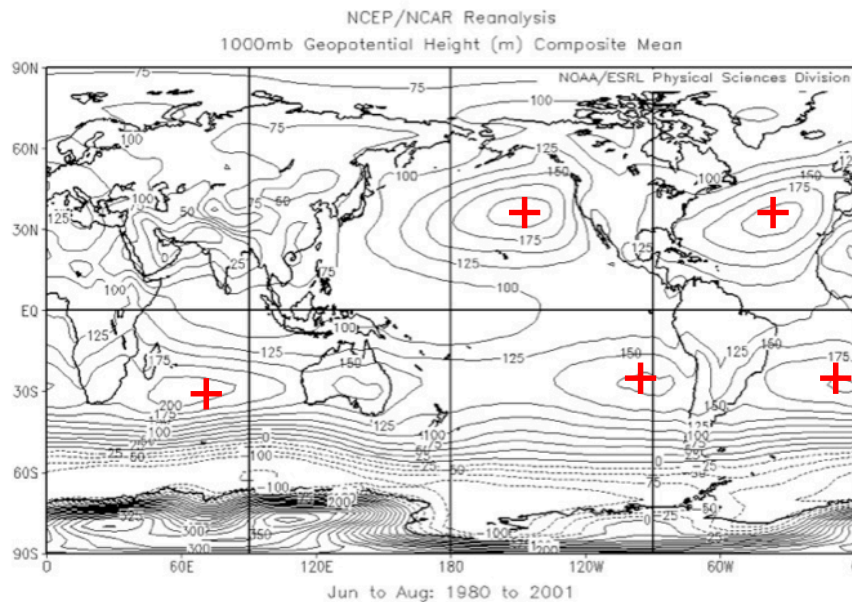
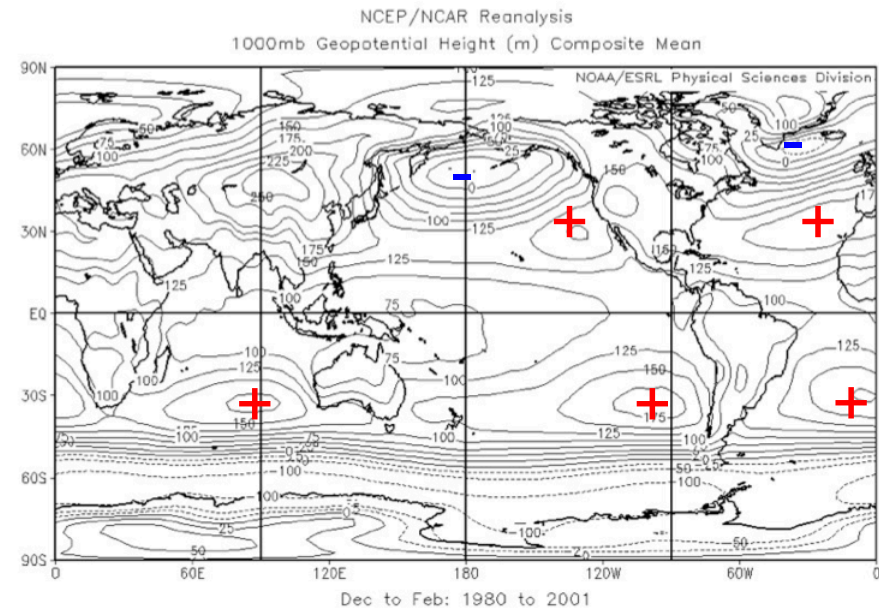


Figure 7.36 Annual average global wind patterns and surface high-pressure areas over the oceans.

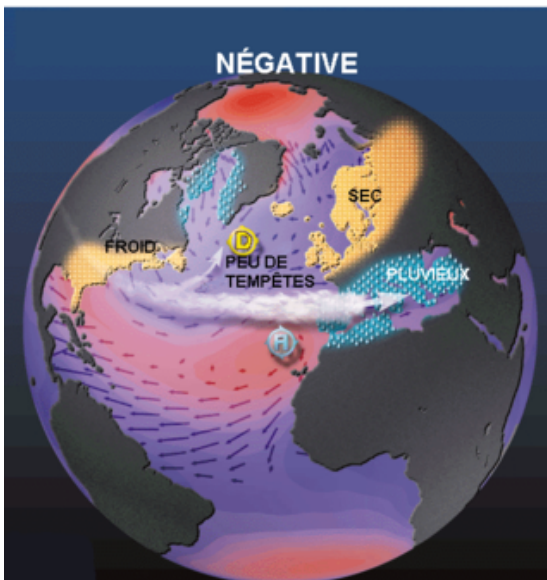
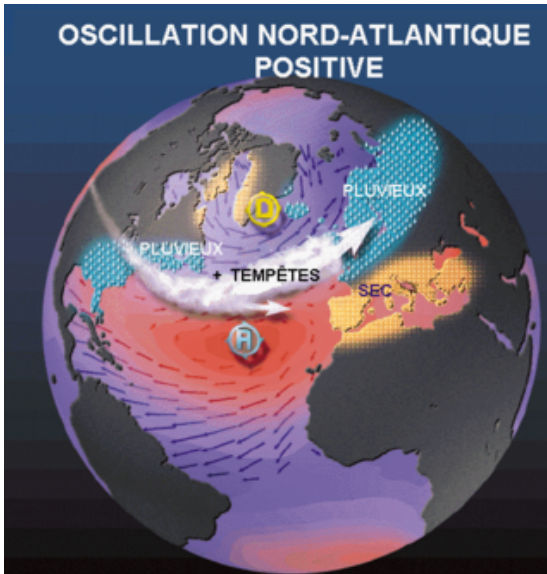
Geopotential height at 1000hPa: DJF



high p ⇔ descending branch Hadley circulation



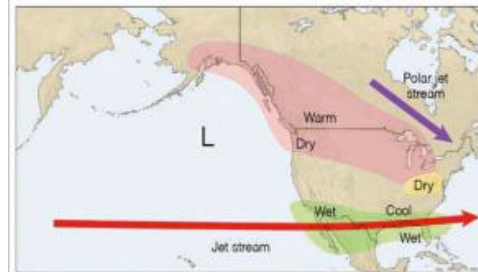
Peixoto and Oort, see course website for reference



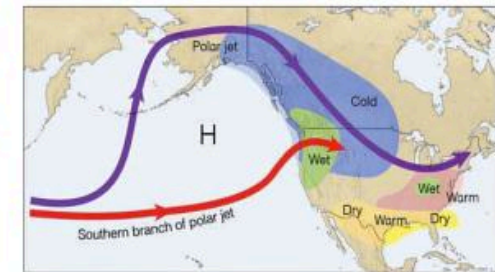
anticyclone des Açores +
dépression d'Islande
⇒ Oscillation Nord-Atlantique (positive ⇔ forte
différence de pression)

Impact sur Europe du nord:
+ hivers doux et pluvieux
- hivers froids et secs

216 Chapter 7



(a) El Niño Conditions



(b) La Niña Conditions

● **Figure 7.42** Typical winter weather patterns across North America during an El Niño warm event (a) and during a La Niña cold event (b). During El Niño conditions, a persistent trough of low pressure forms over the north Pacific and, to the south of the low, the jet stream (from off the Pacific) steers wet weather and cyclonic storms into California and the southern part of the United States. During La Niña conditions, a persistent high-pressure area forms south of Alaska forcing the polar jet stream and accompanying cold air over much of western North America. The southern branch of the polar jet stream directs moist air from the ocean into the Pacific Northwest, producing a wet winter for that region.