



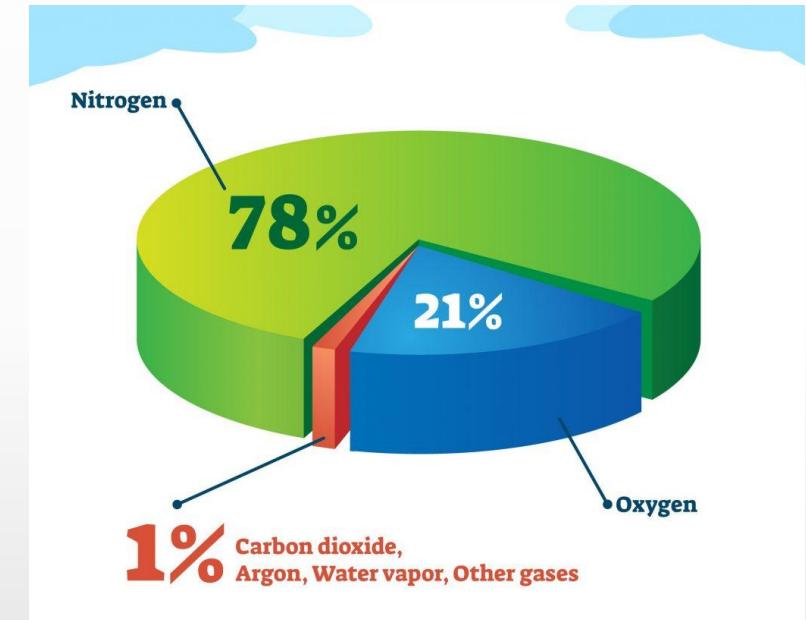
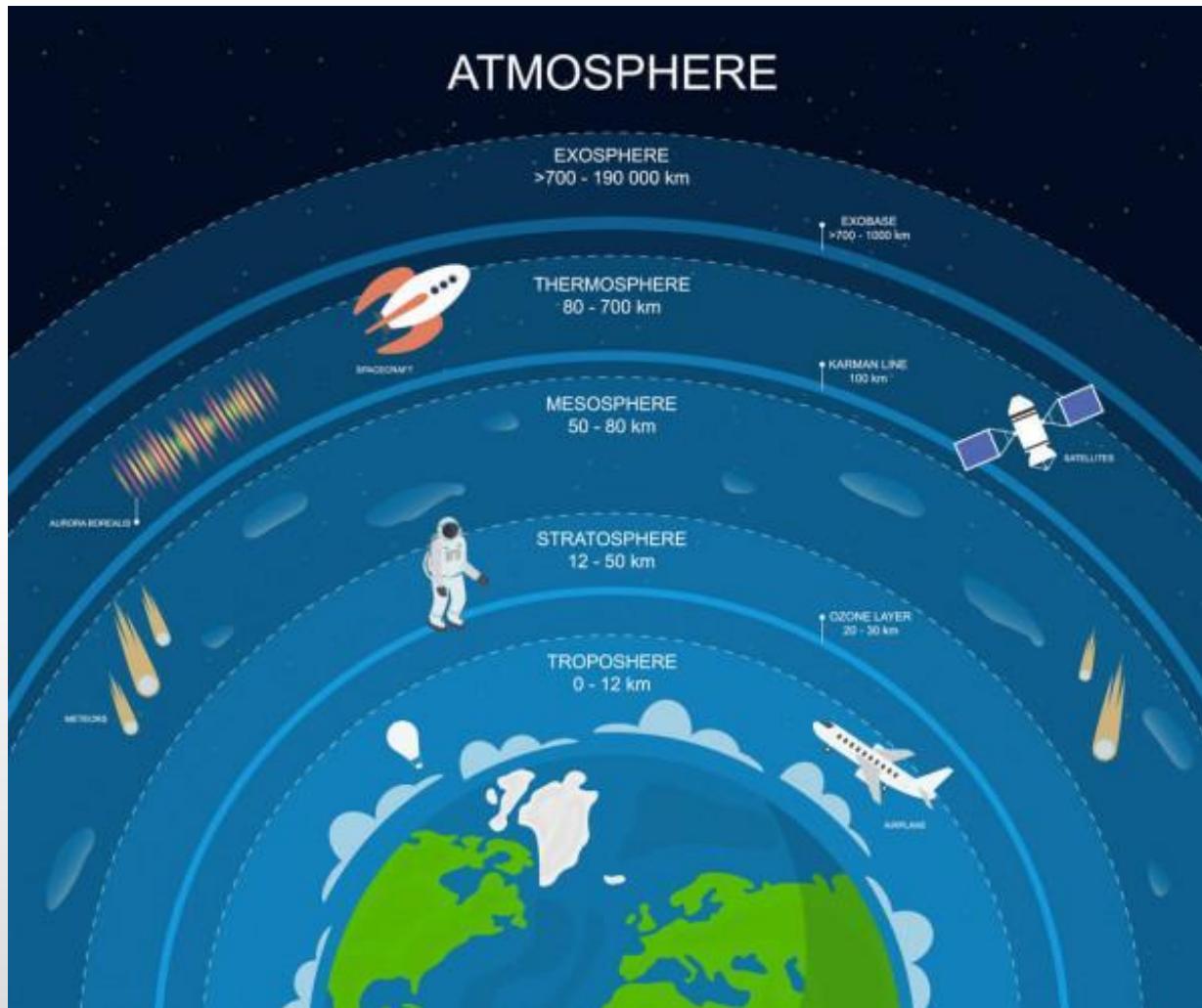
METEOROLOGY

Unlocking the Secrets of the Skies

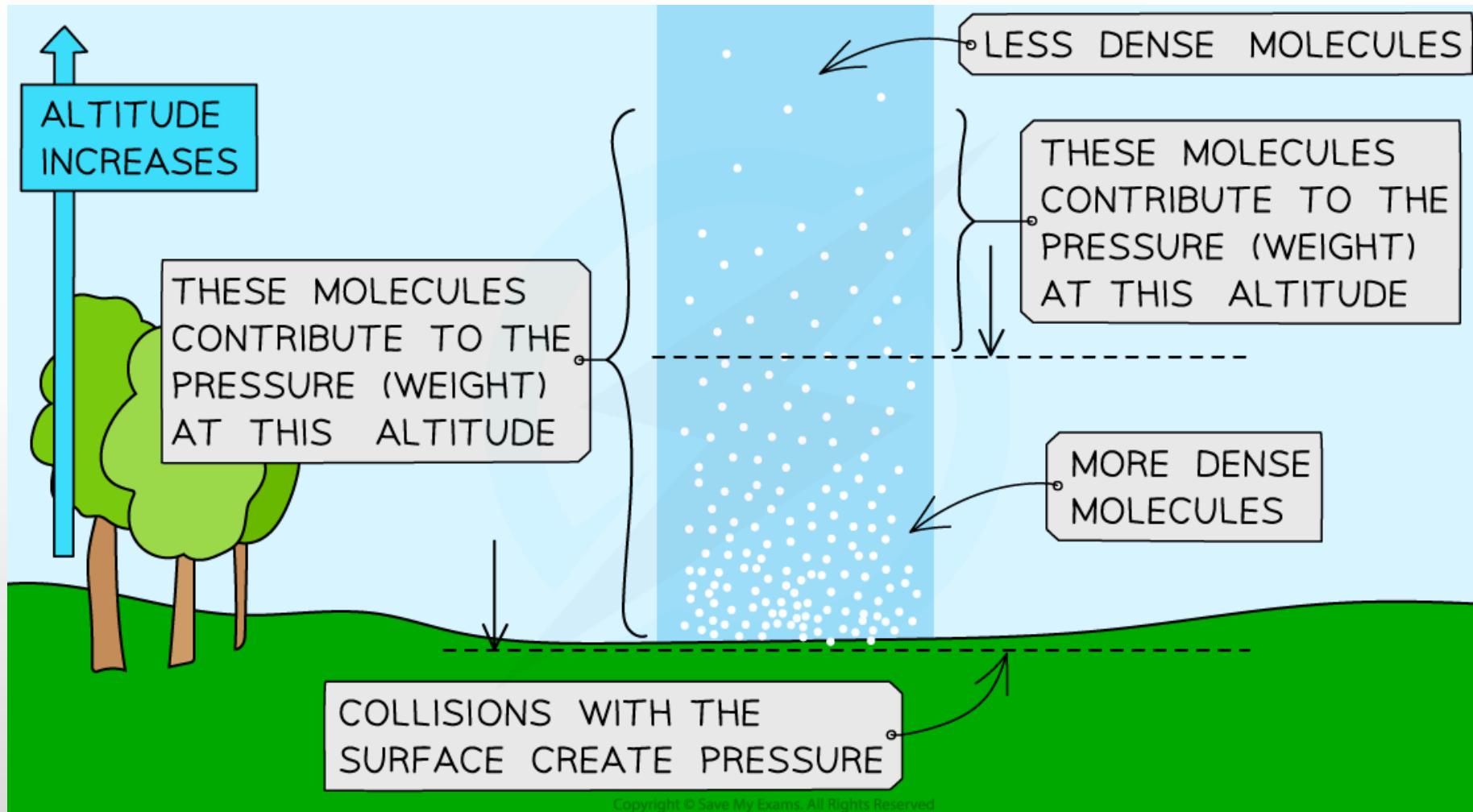
OUTLINE

1. Atmosphere (composition, pressure, temperature, gradient)
2. Physical State of Water & Humidity
3. Clouds
4. Air Masses, Fronts
5. Wind
6. Turbulence
7. Typical Weather Situations For Switzerland
8. Decision making strategy

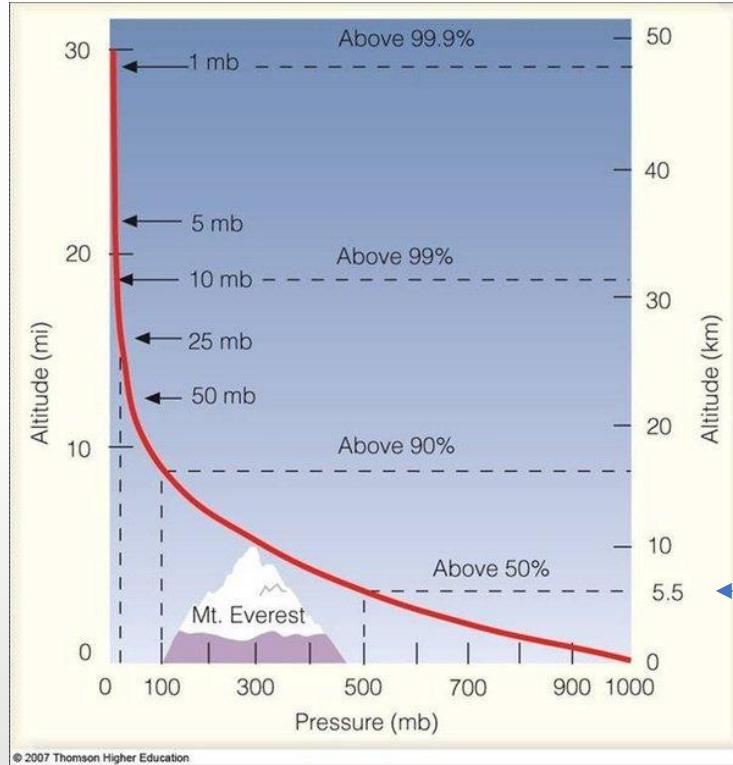
1. Atmosphere (composition)



1. Atmosphere (Atmospheric Pressure)



1. Atmosphere (Atmospheric Pressure)

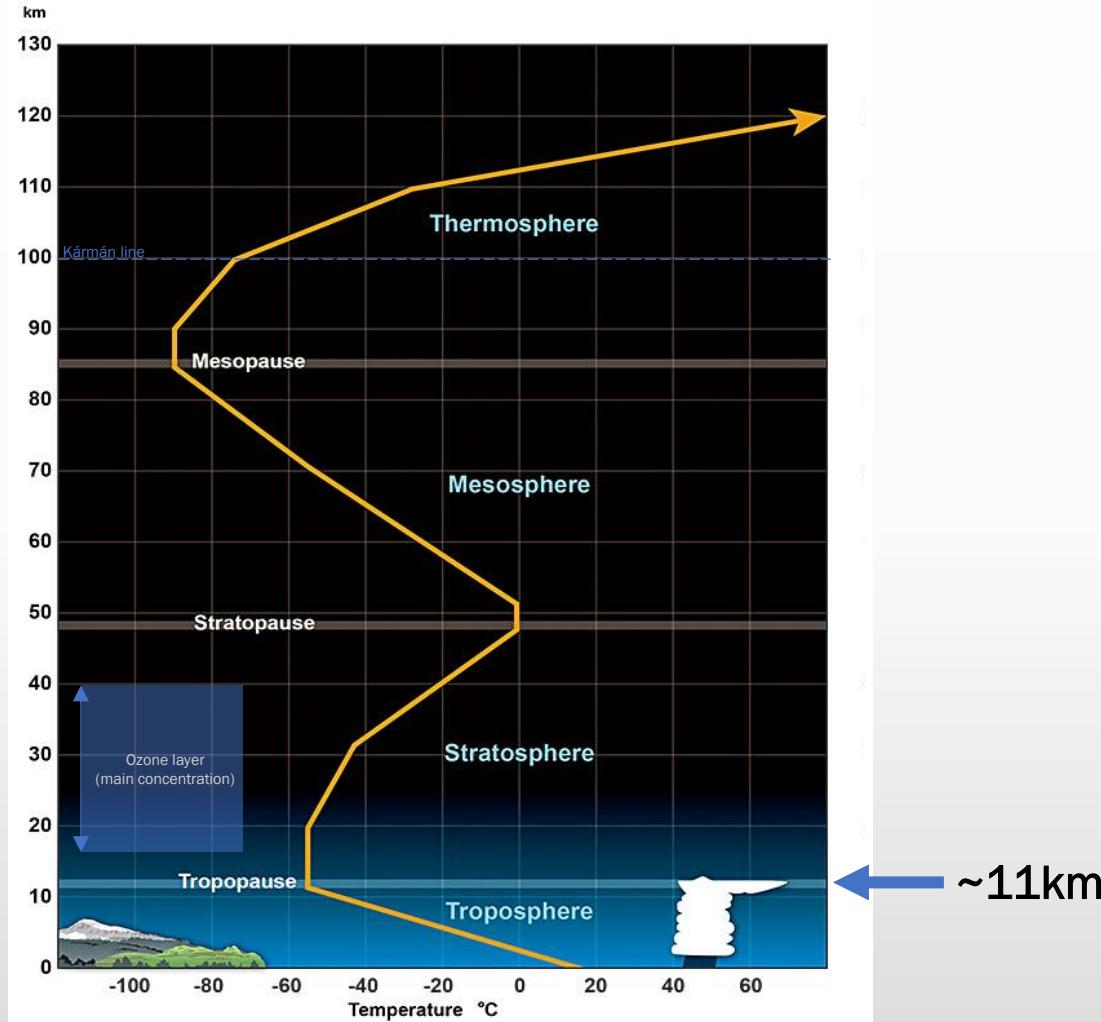


Standard Pressure: 1013.25 hPa (mb) at MSL, 15 °C

Pressure could vary depending on the pressure system
(some extremes in Europe: 955 hPa - 1035 hPa)

Reducing with altitude, (~50% in every ~5500m)

1. Atmosphere (temperature)

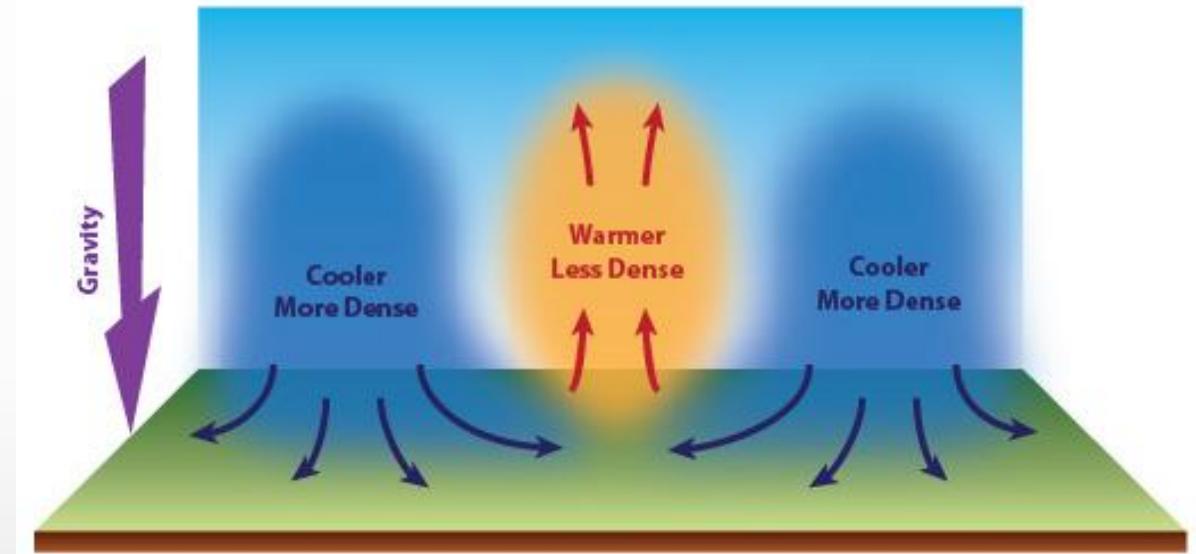
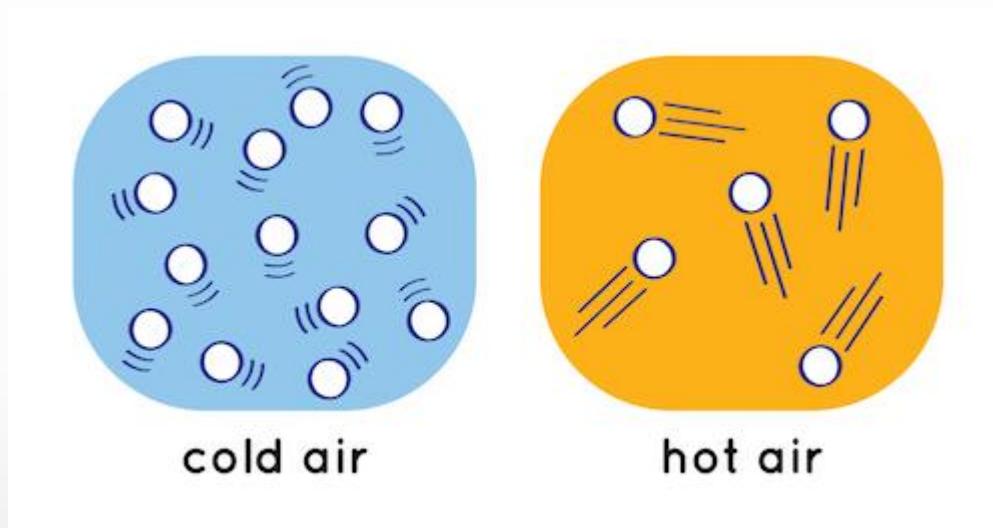


Temperature change (gradient) with altitude

- Decreasing average: $-0.65^{\circ}\text{C}/100\text{m}$
- Increasing (inversion)
- Staying constant (isotherm)



1. Atmosphere (temperature)

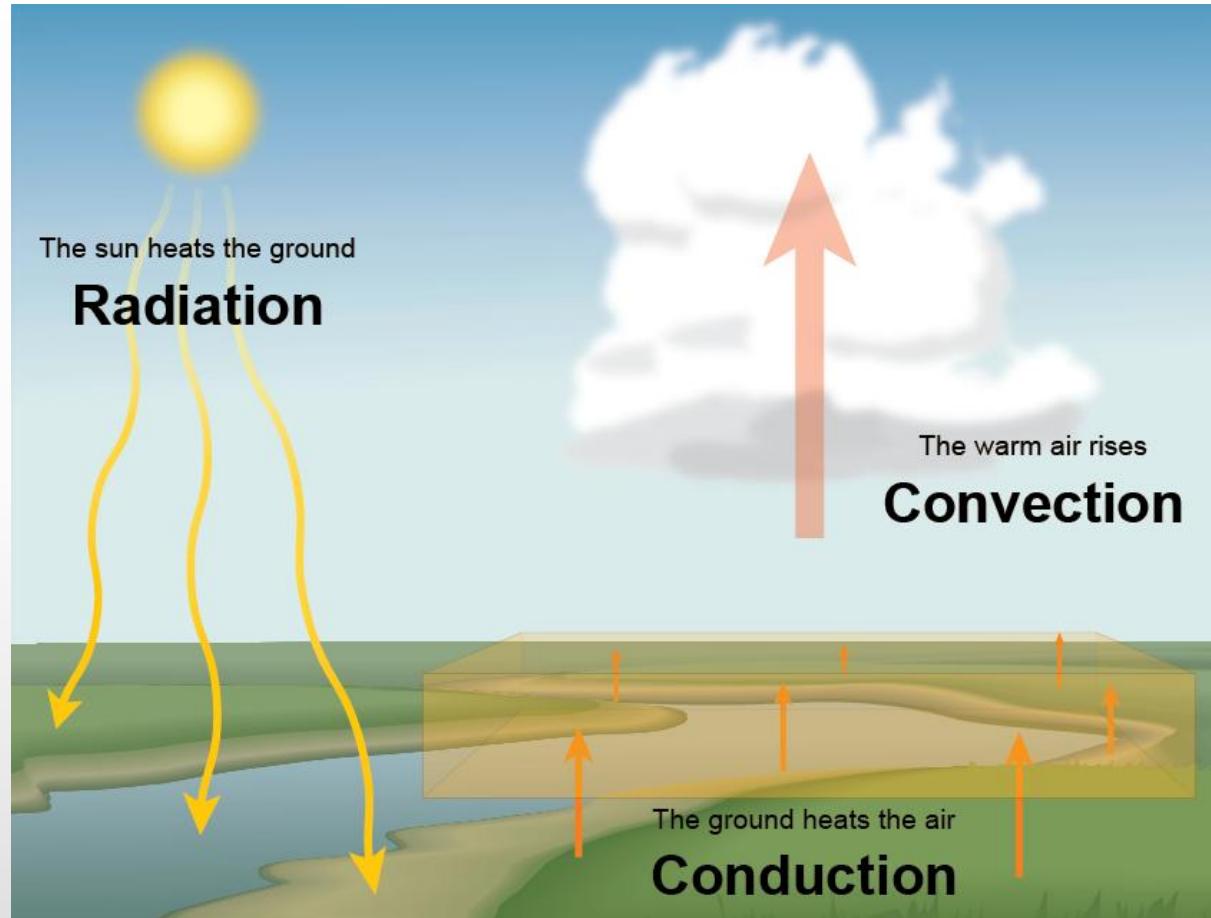


VOLUME = VOLUME

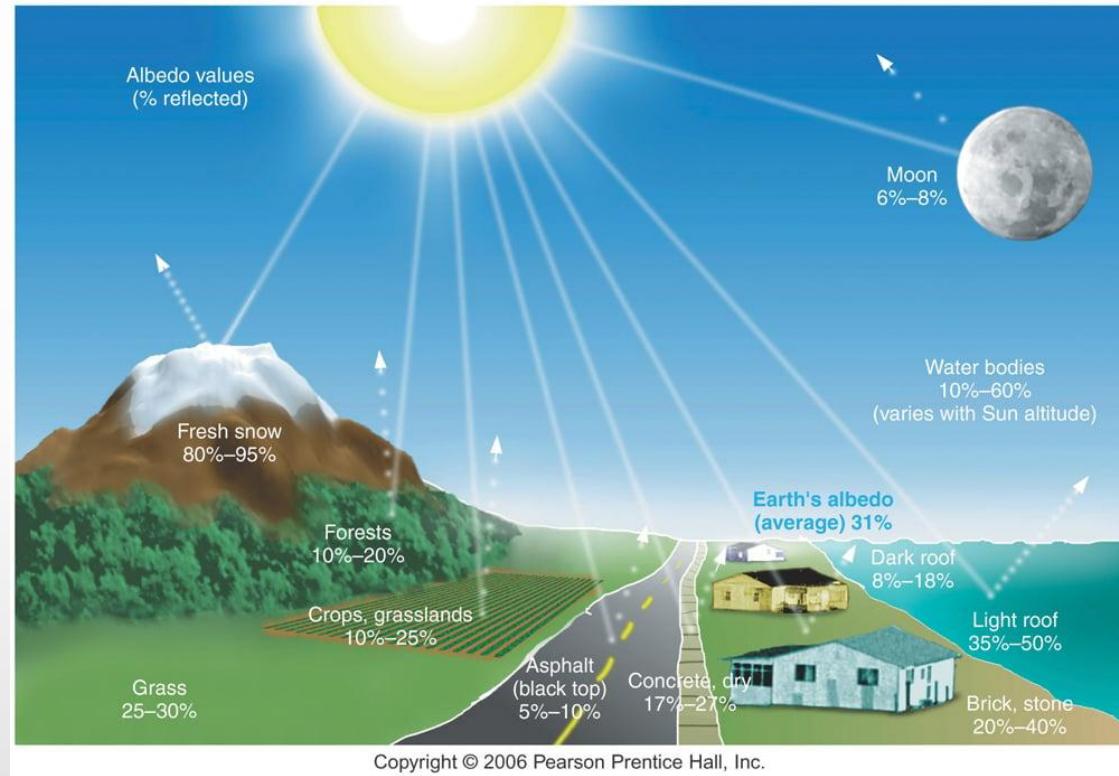
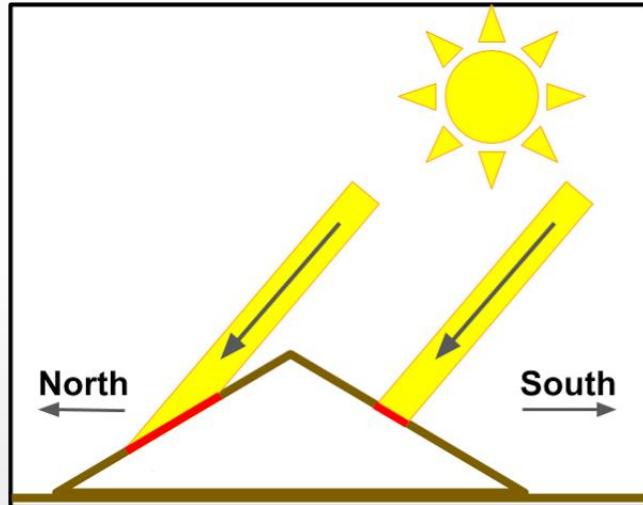
MASS > MASS

DENSITY > DENSITY

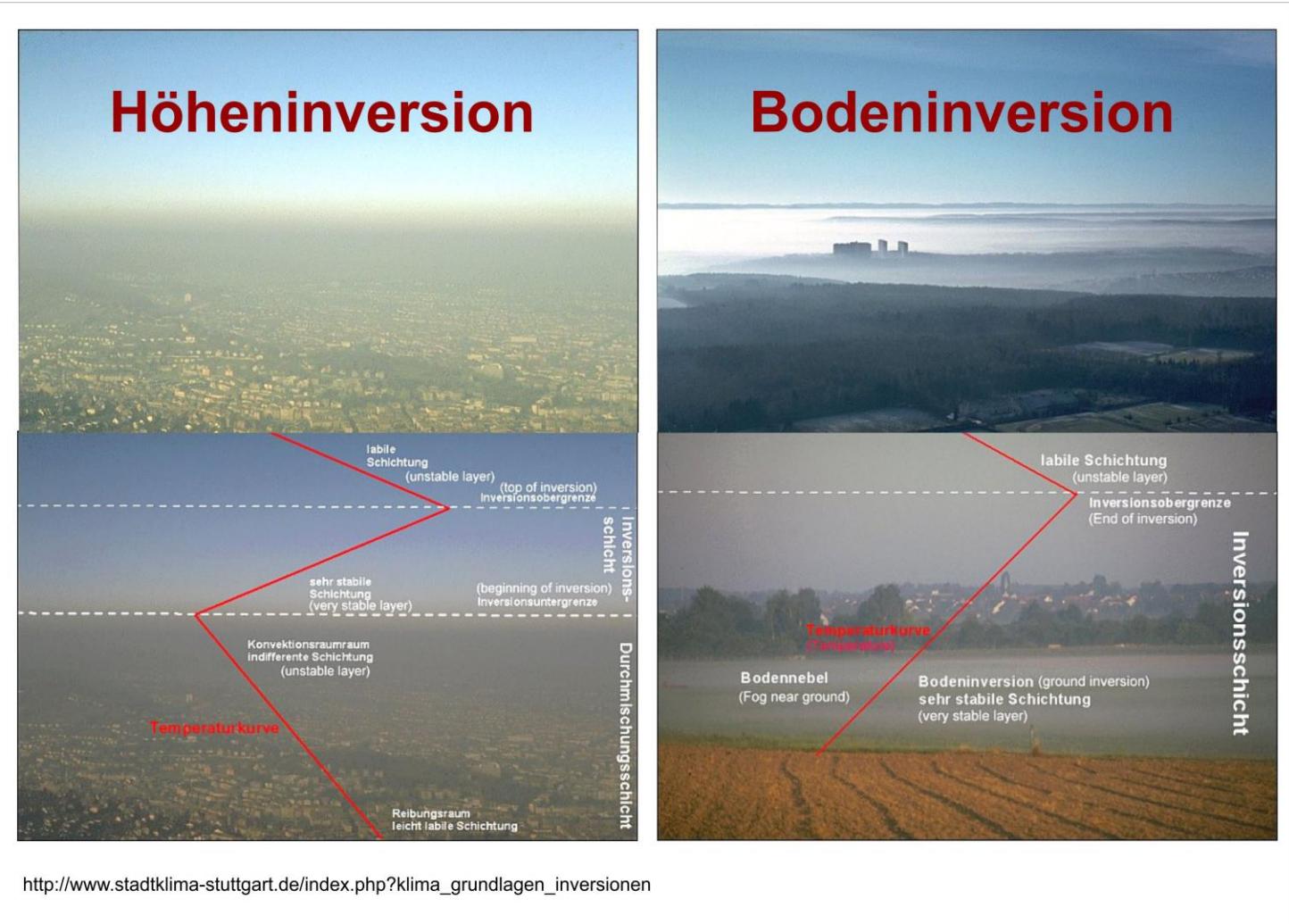
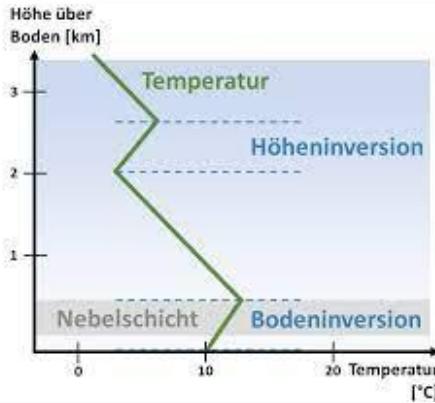
1. Atmosphere (temperature)



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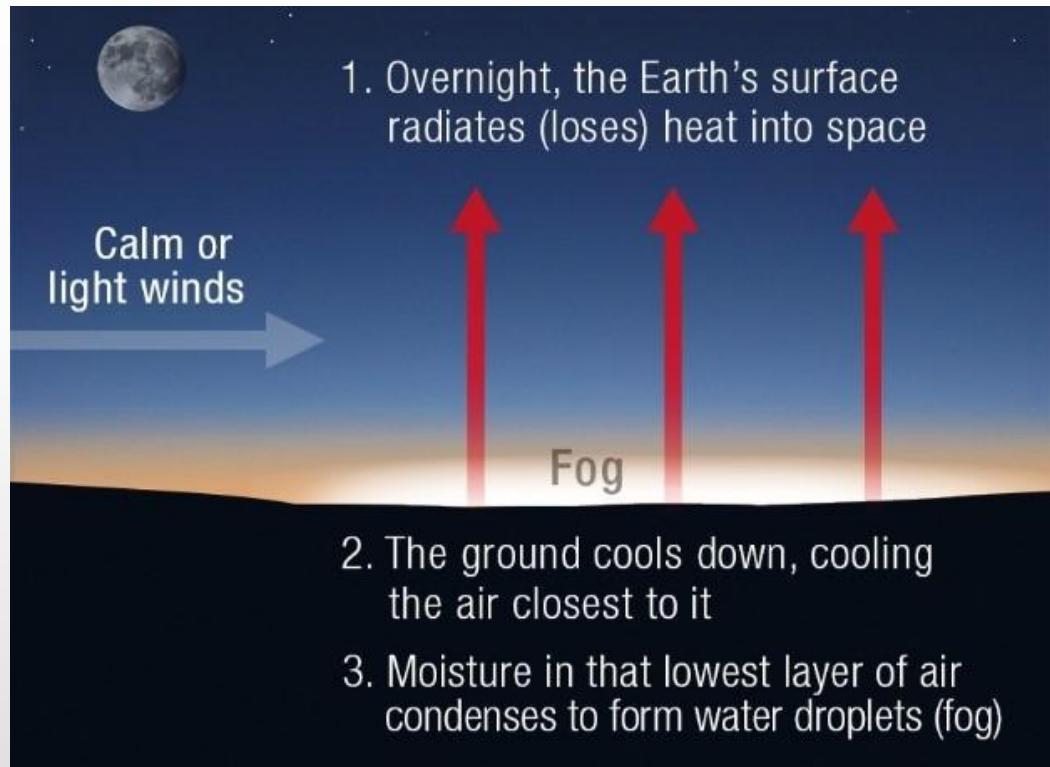


1. Atmosphere (temperature)

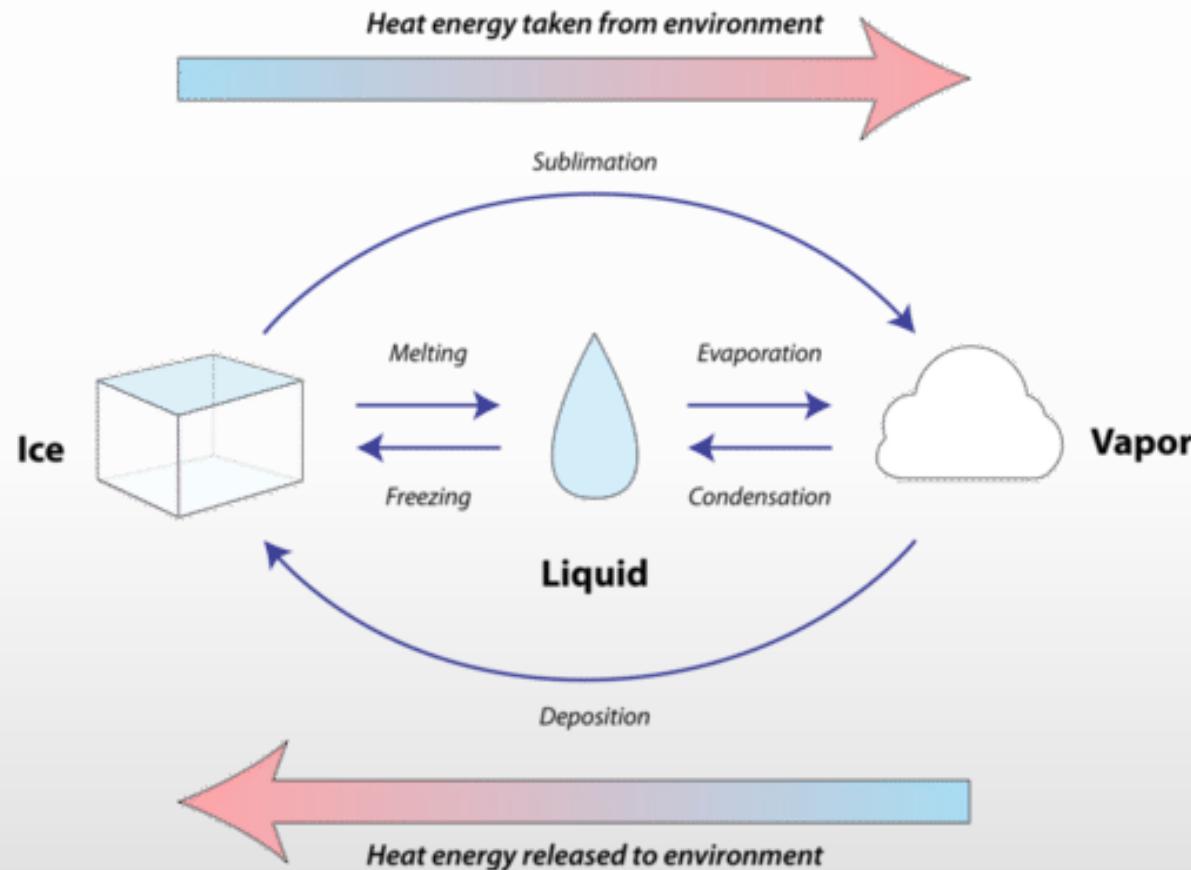


http://www.stadtklima-stuttgart.de/index.php?klima_grundlagen_inversionen

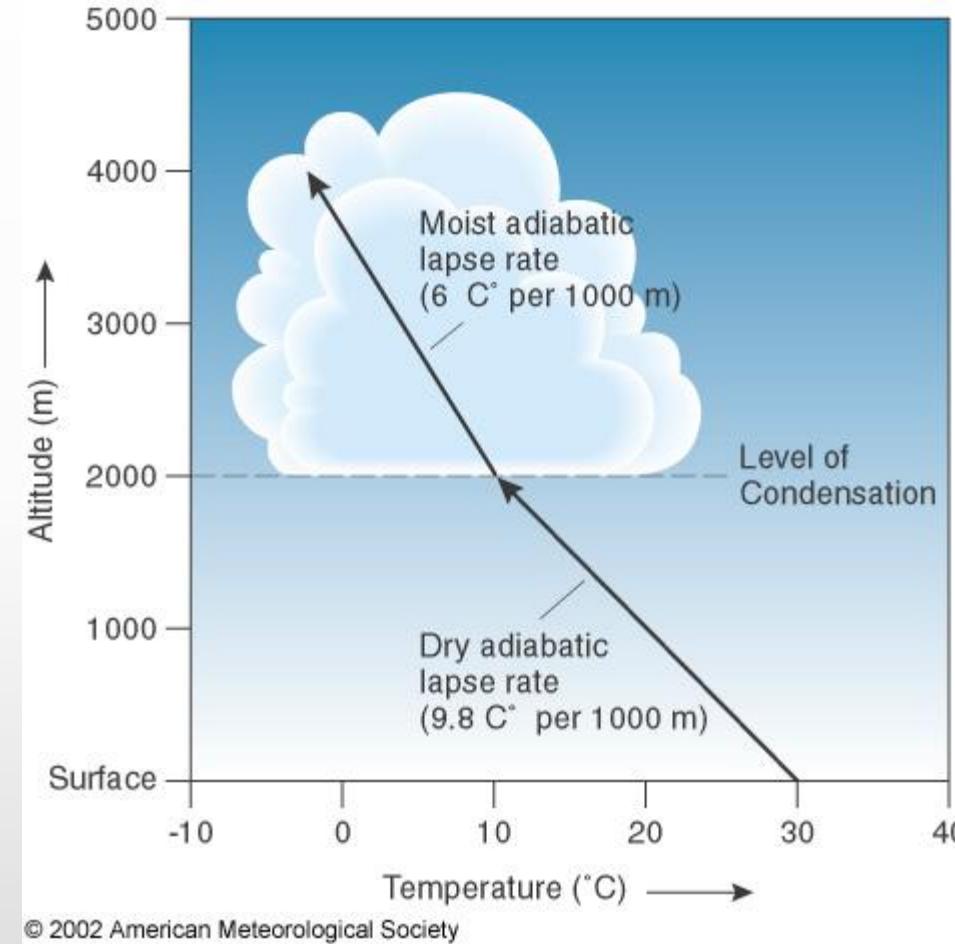
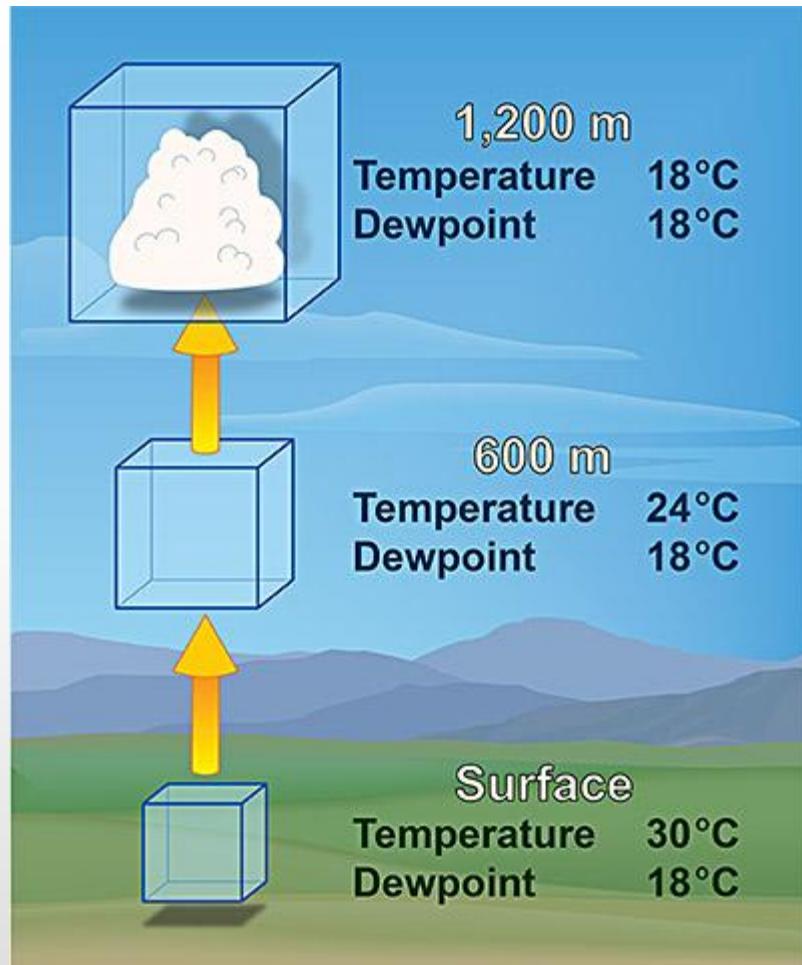
1. Atmosphere (temperature)



2. Physical State of Water & Humidity



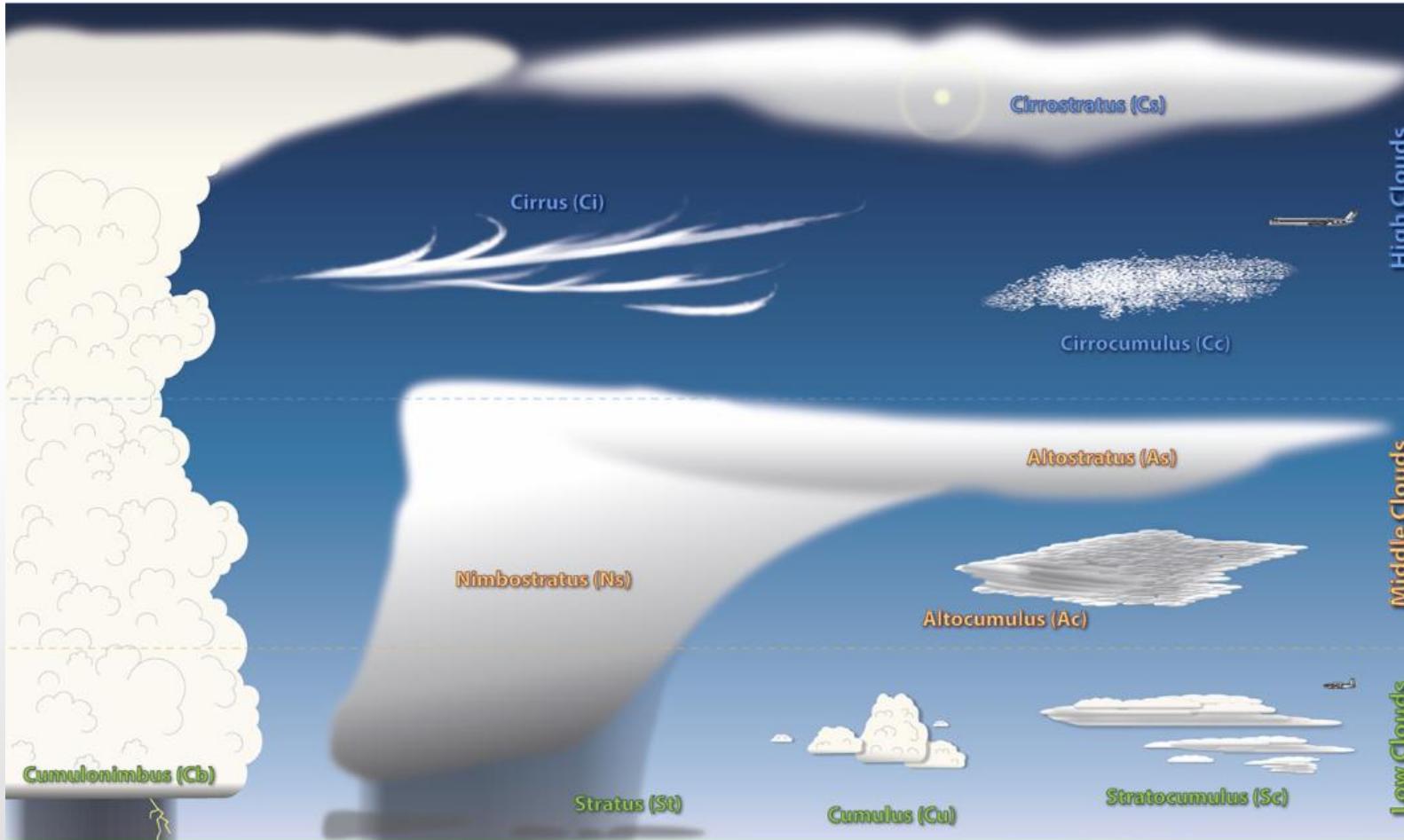
2. Physical State of Water & Humidity



<1 °C/100m

~1 °C/100m

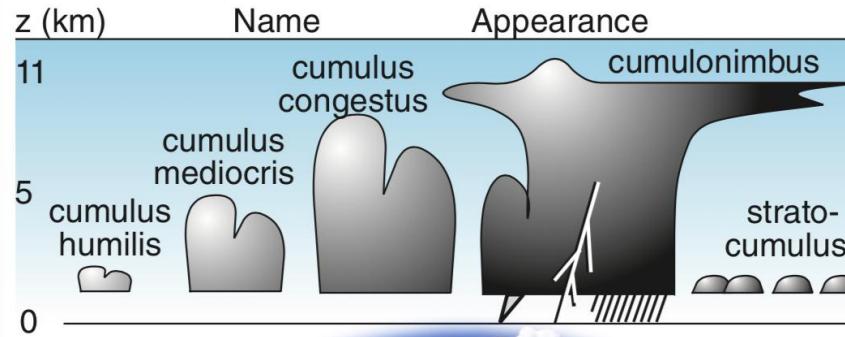
3. Clouds



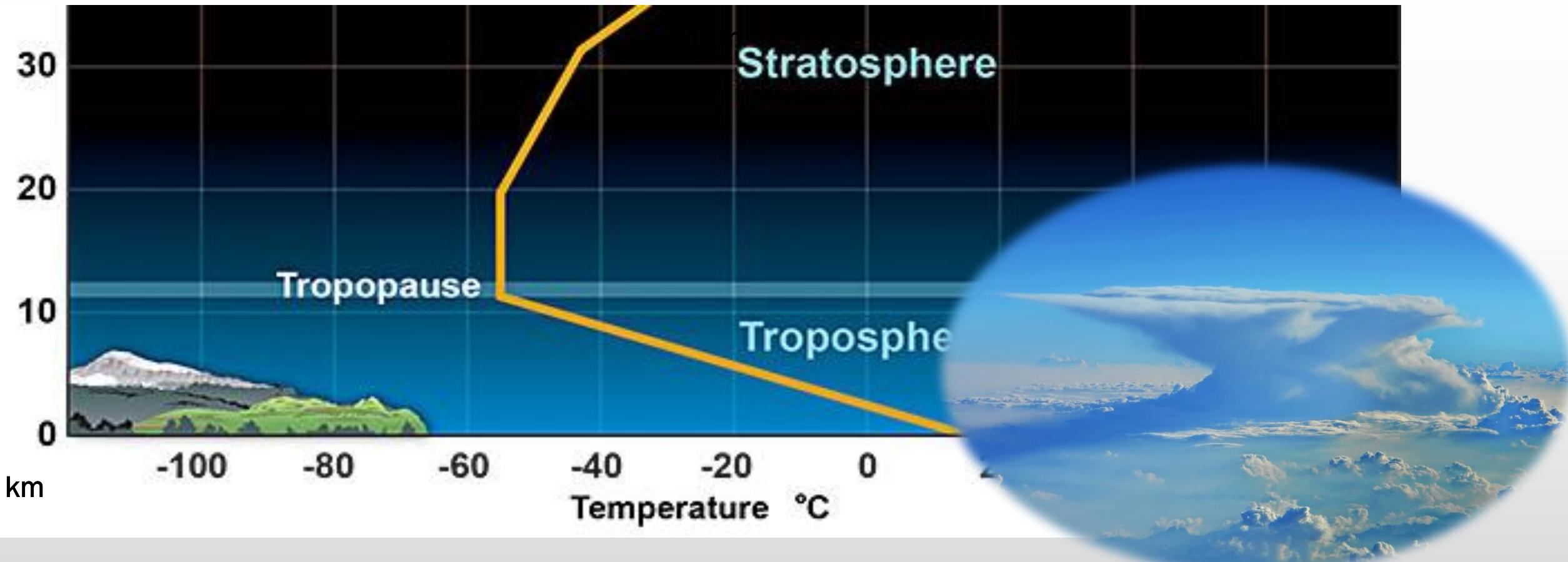
Cirro- (~5-15km)

Alto- (~2-7km)

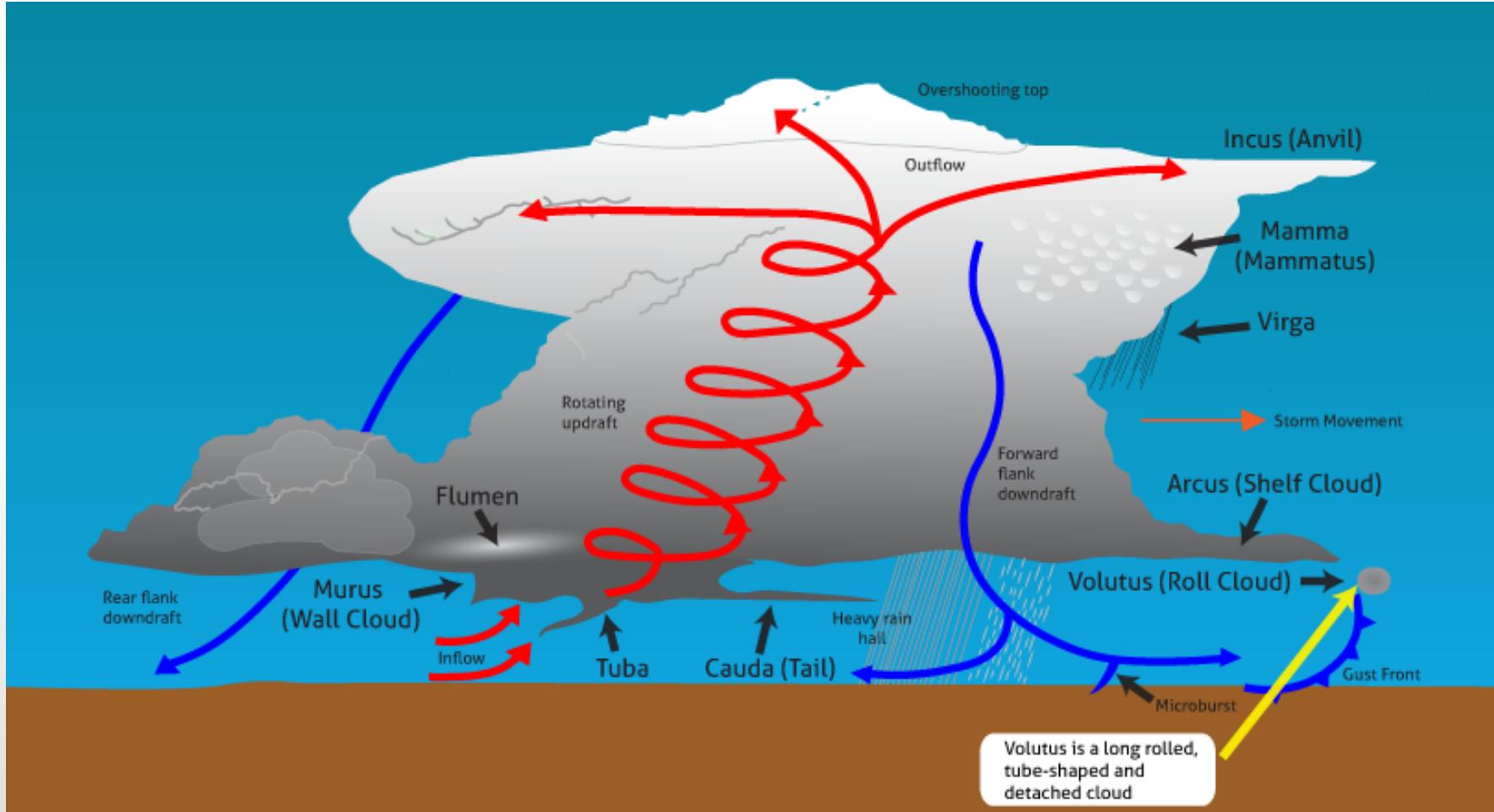
3. Clouds



3. Clouds



3. Clouds



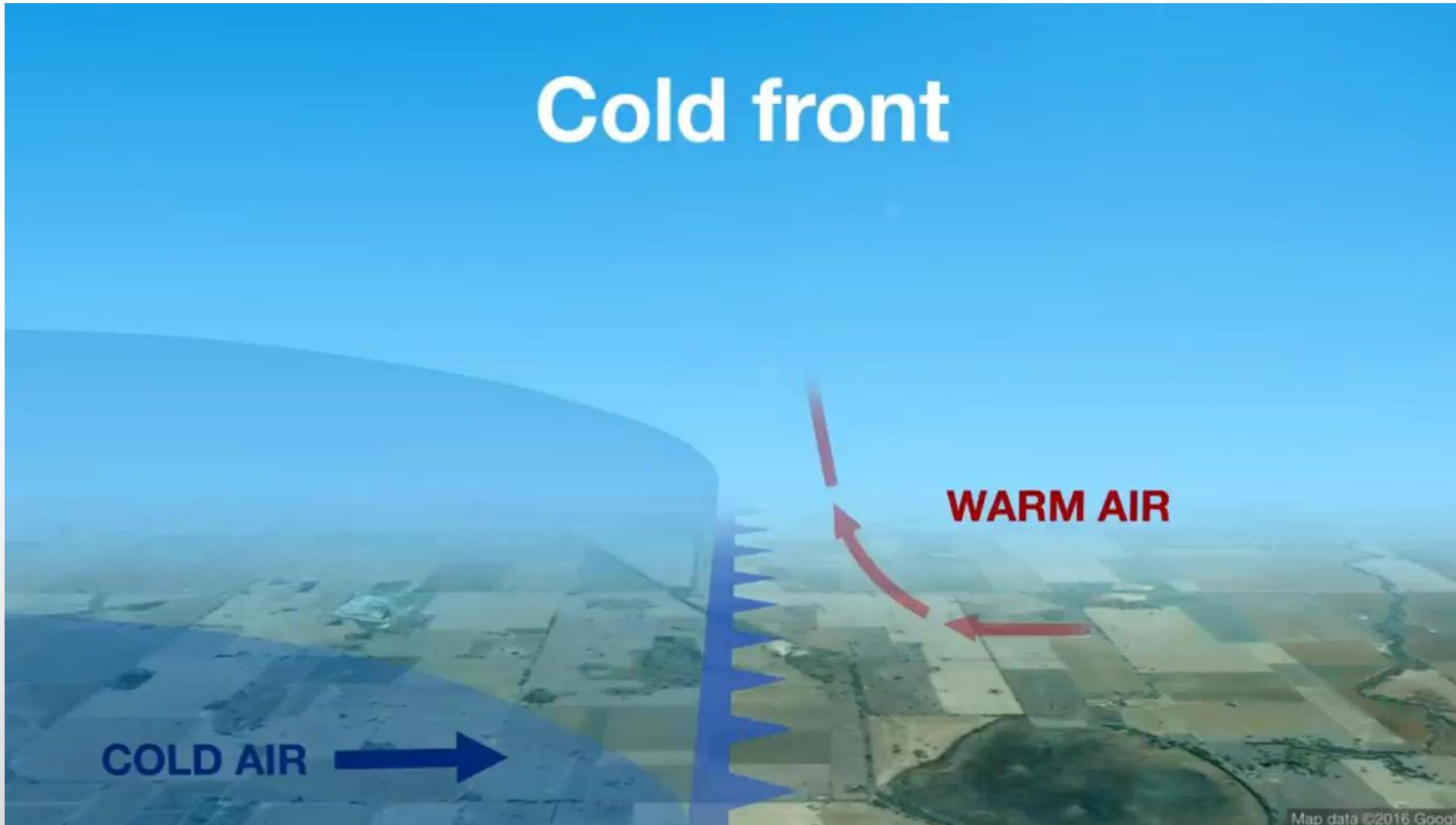
Issues with the Cb ??

Lift / Downdraft

Turbulence

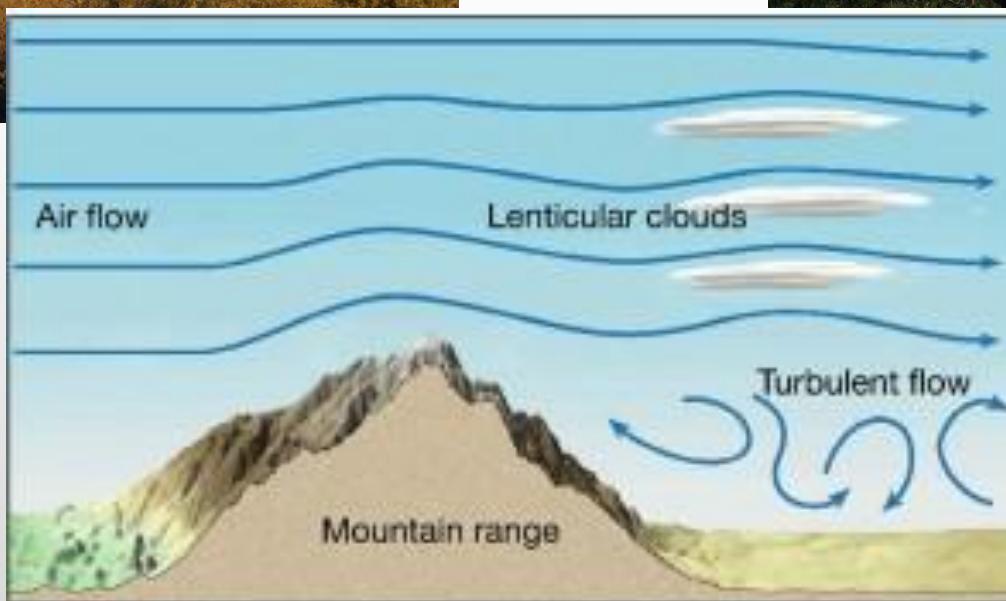
GUST FRONT!!!

3. Clouds

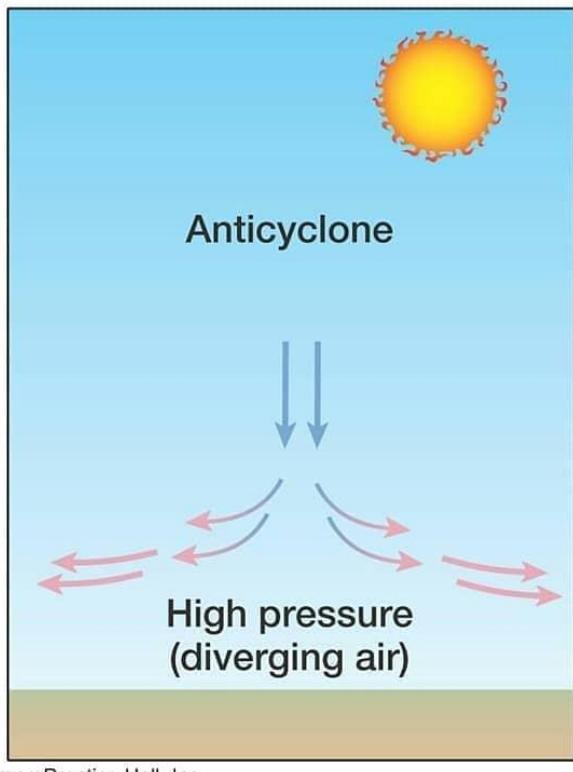
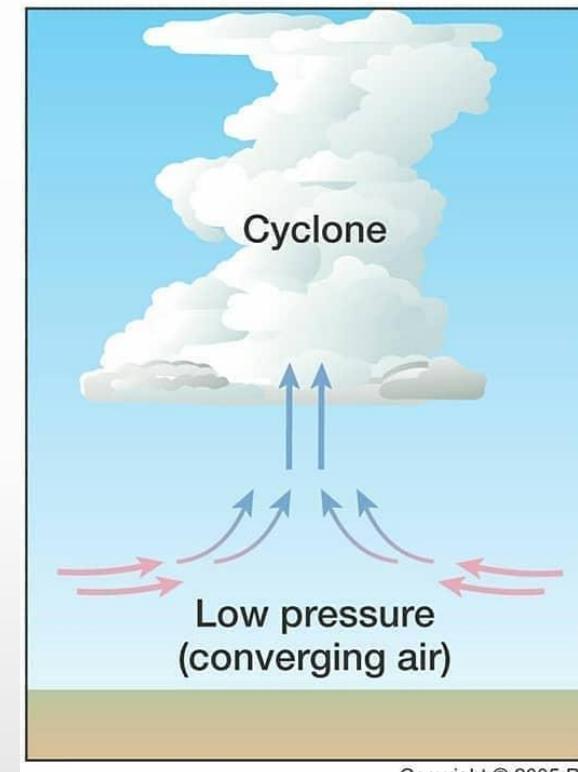
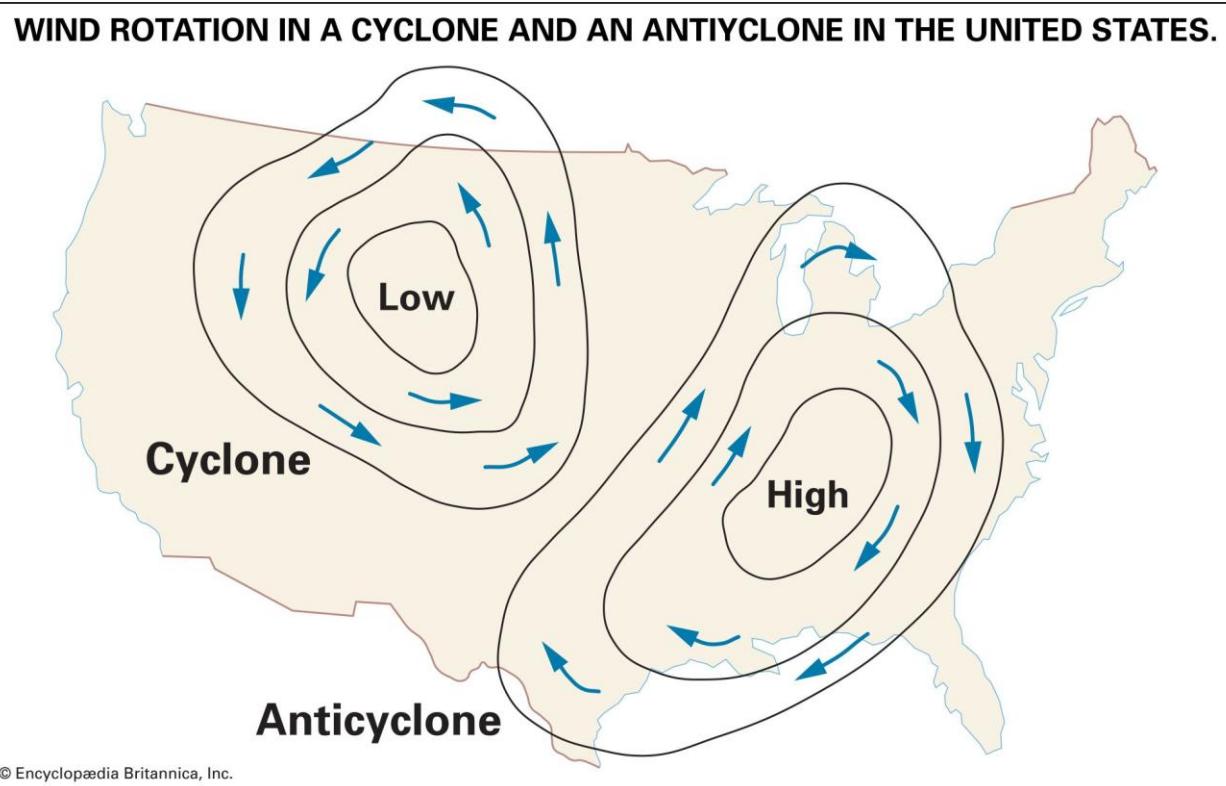


Map data ©2016 Google

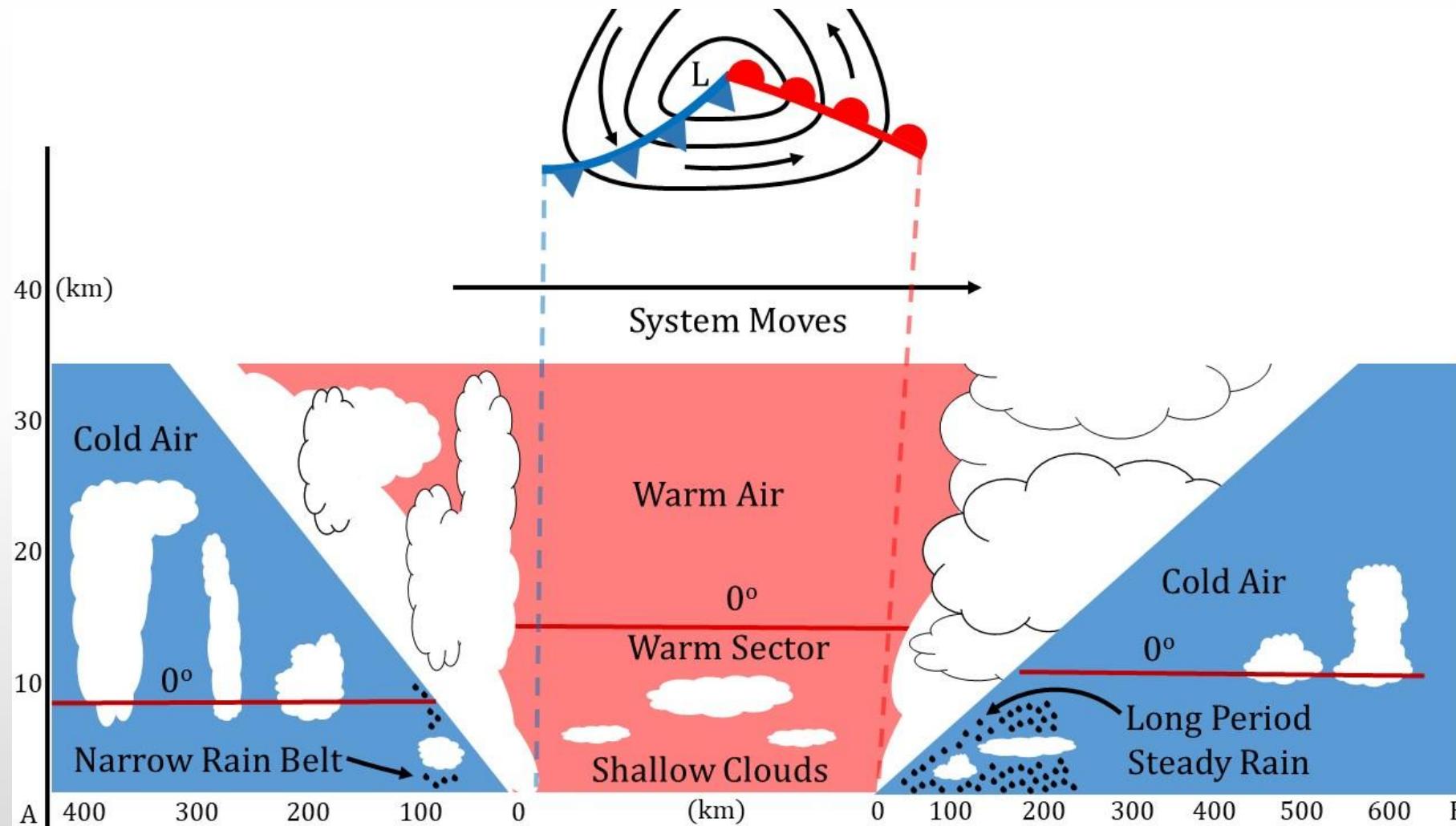
3. Clouds



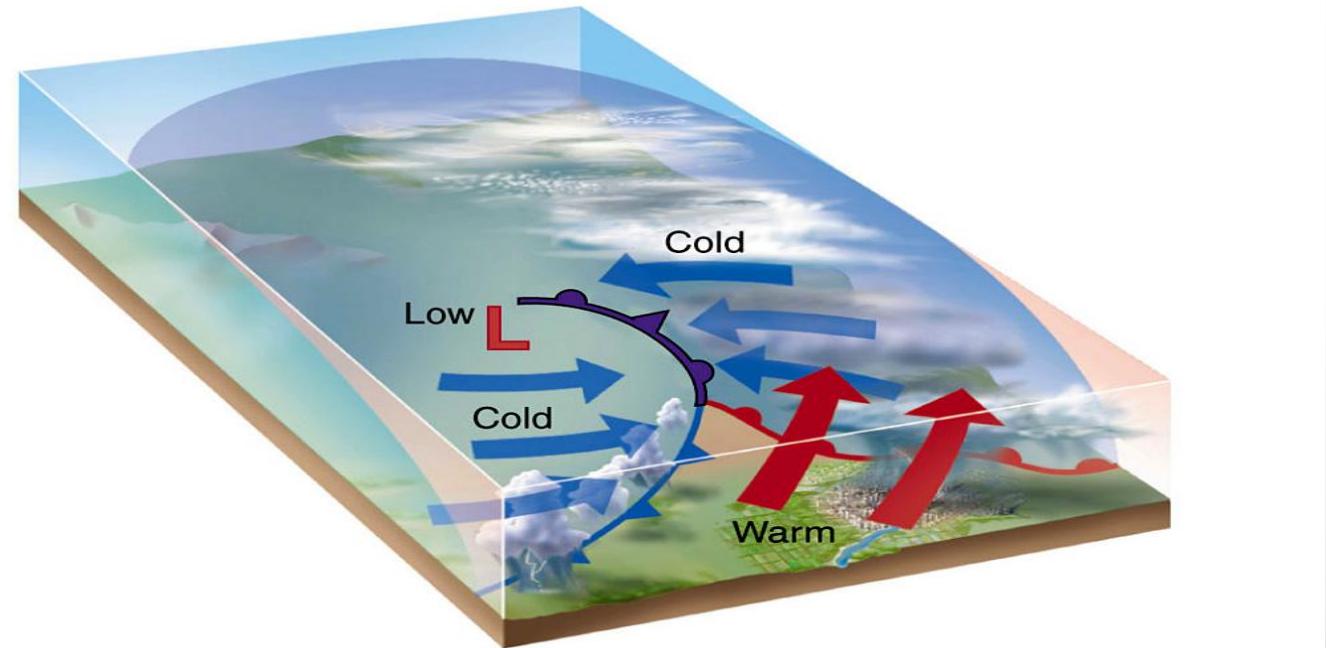
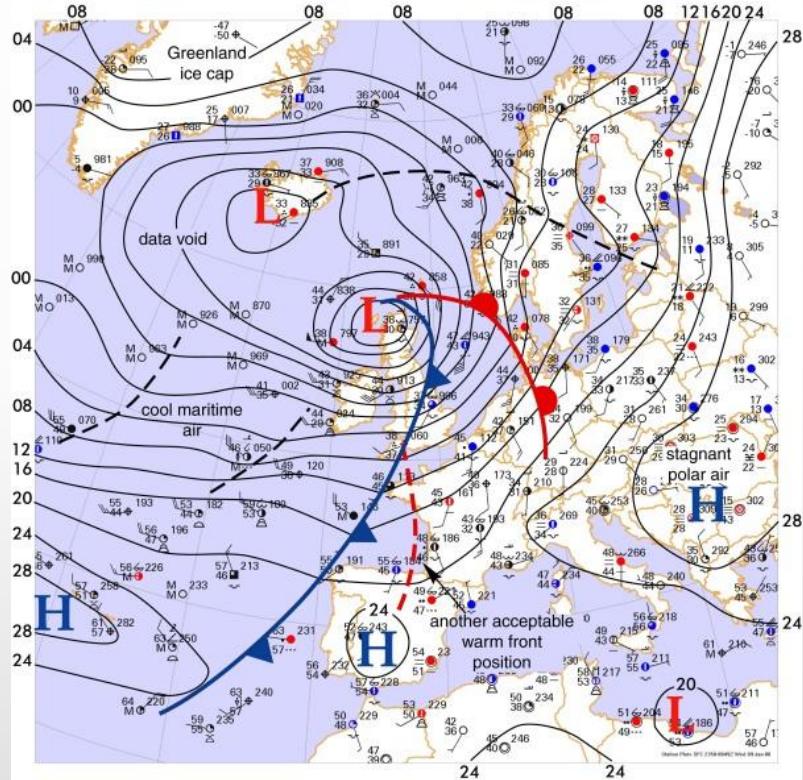
4. Air masses



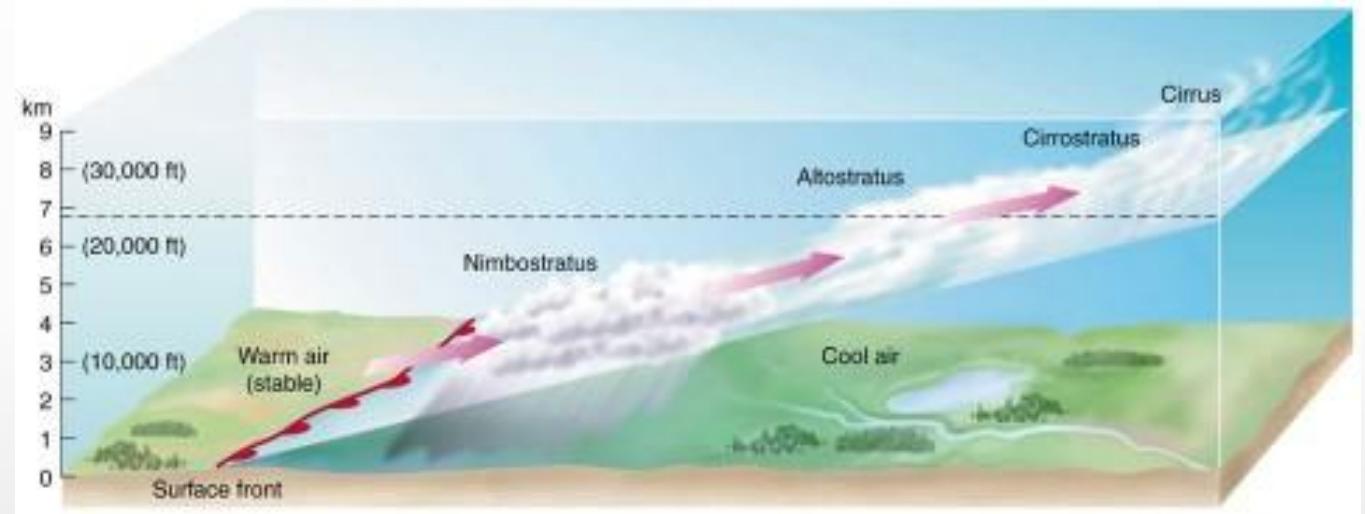
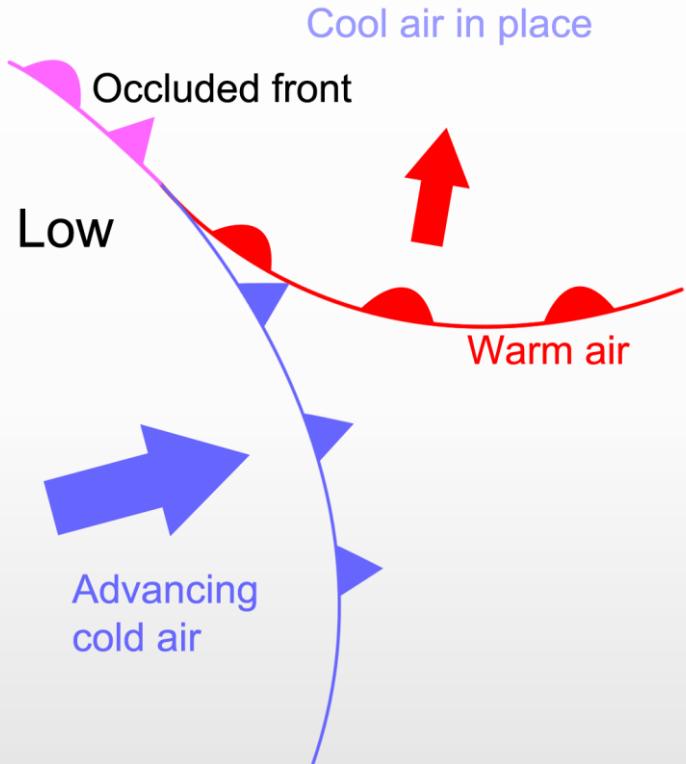
4. Air masses - FRONTS



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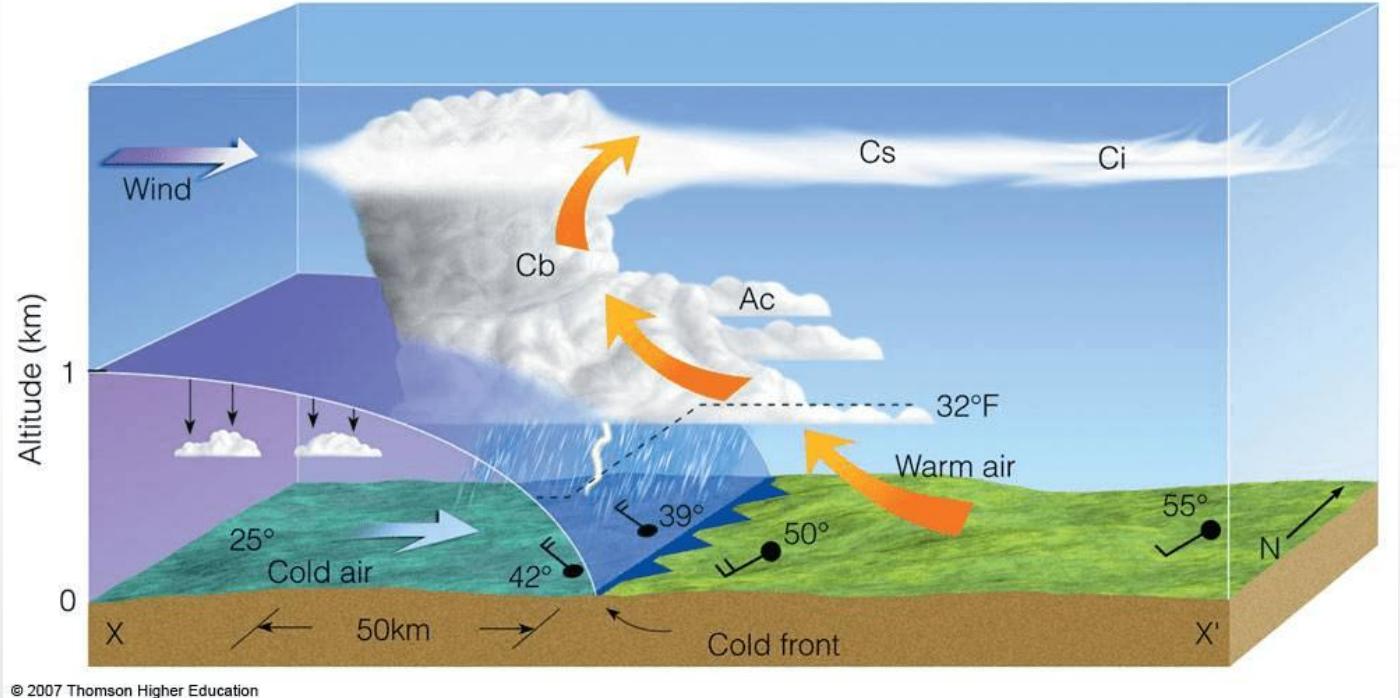
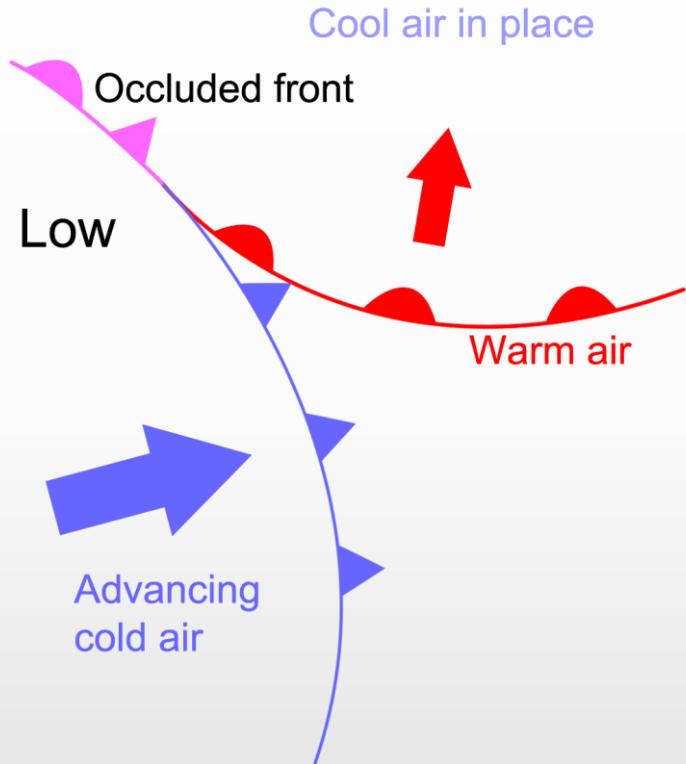


4. Air masses – FRONTS (warm)



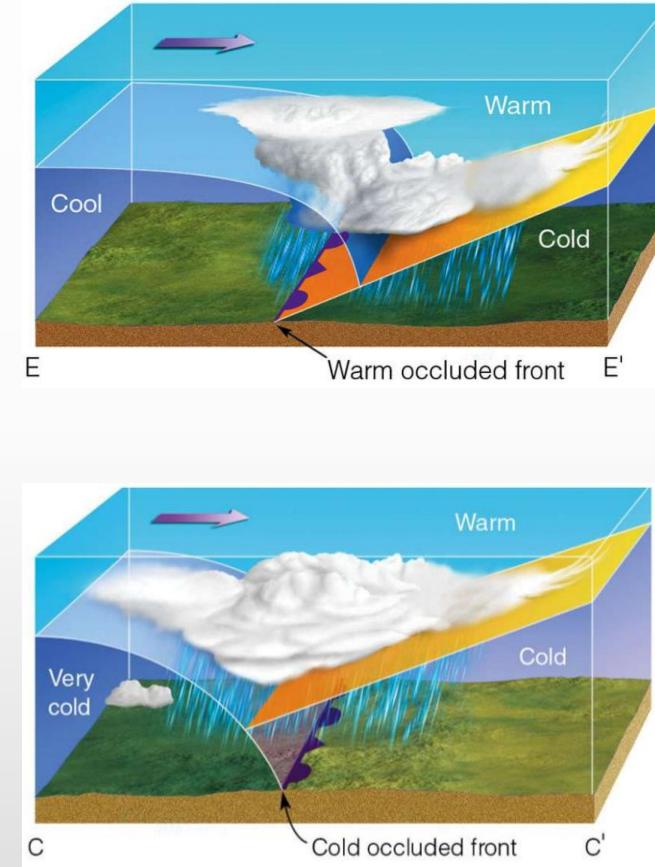
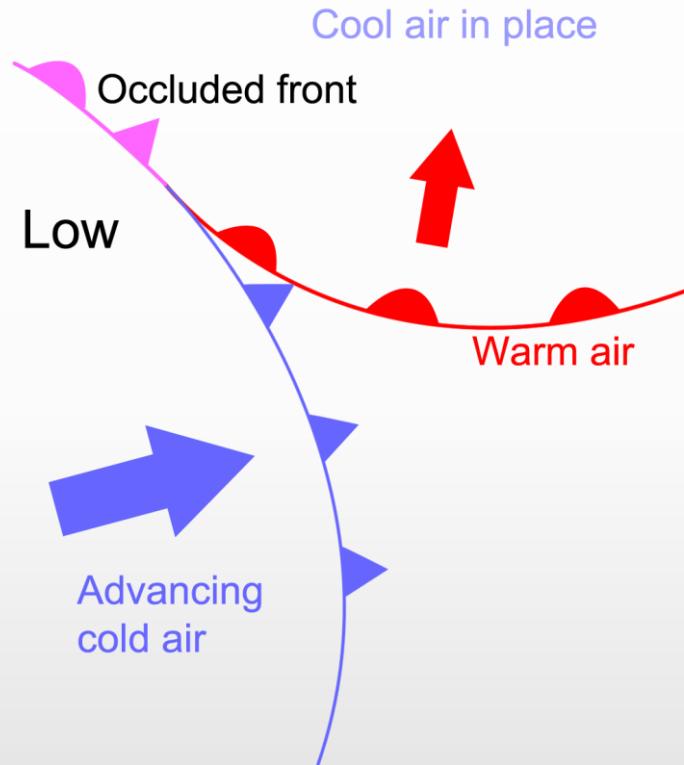
Clouds
Speed

4. Air masses – FRONTS (cold)



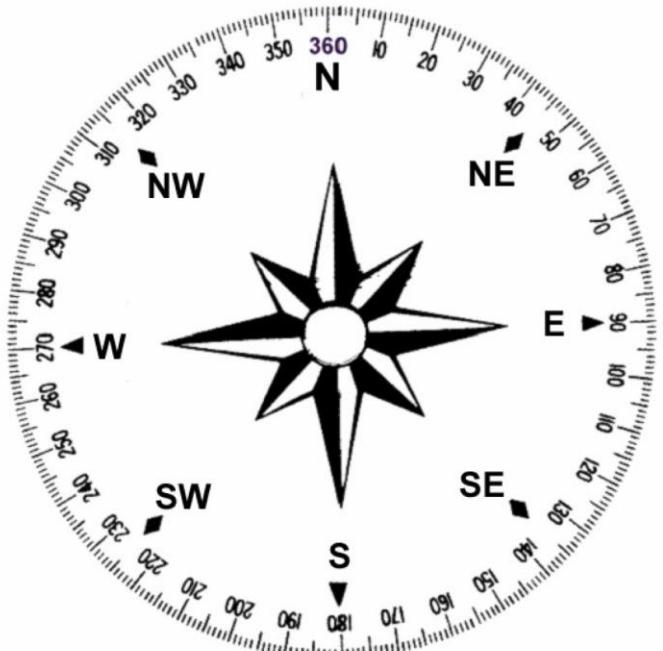
Clouds
Speed

4. Air masses – FRONTS (occlusion)

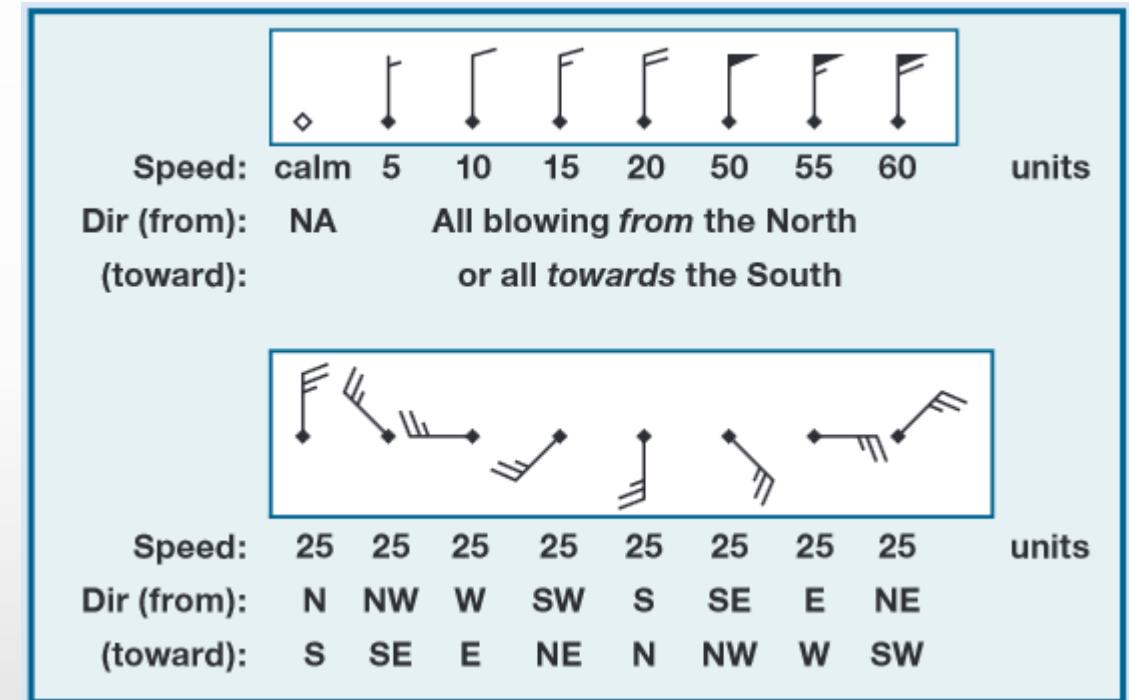


5. Wind

Wind Direction



Common	Degree
N	350, 360, 010
N/NE	20, 30
NE	40, 50
E/NE	60, 70
E	80, 90, 100
E/SE	110, 120
SE	130, 140
S/SE	150, 160
S	170, 180, 190
S/SW	200, 210
SW	220, 230
W/SW	240, 250
W	260, 270, 280
W/NW	290, 300
NW	310, 320
N/NW	330, 340



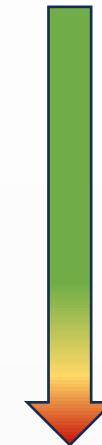
1 kt = 1.852 km/h

1 m/s = 3.6 km/h

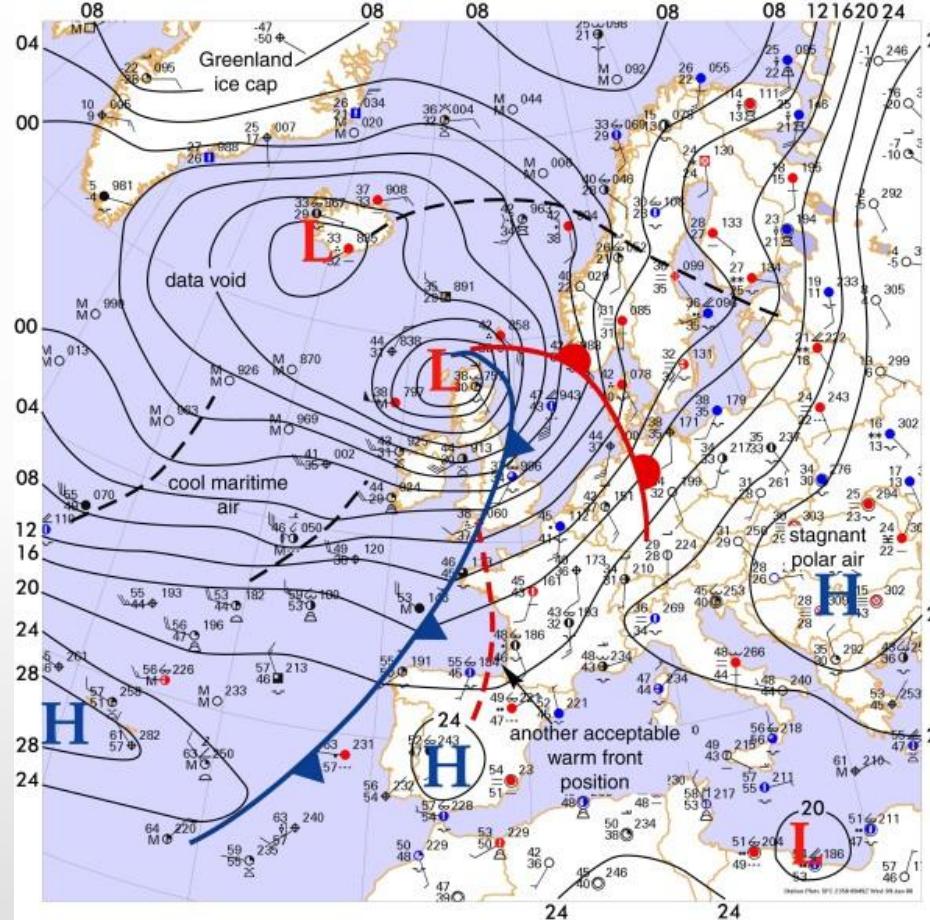
5. Wind

Effect on take off – flying - landing

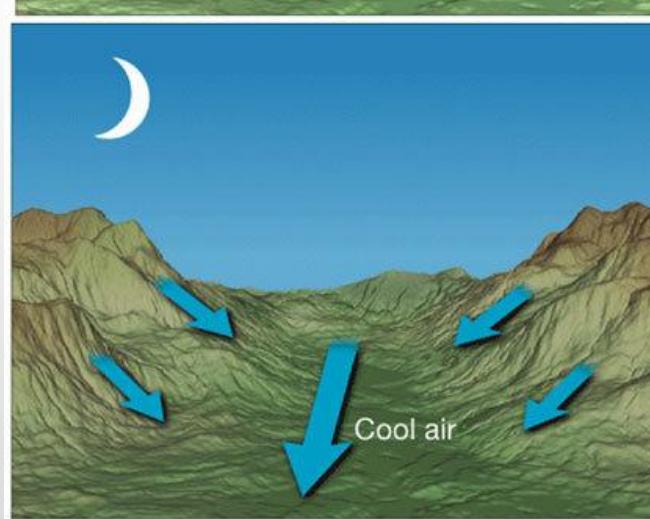
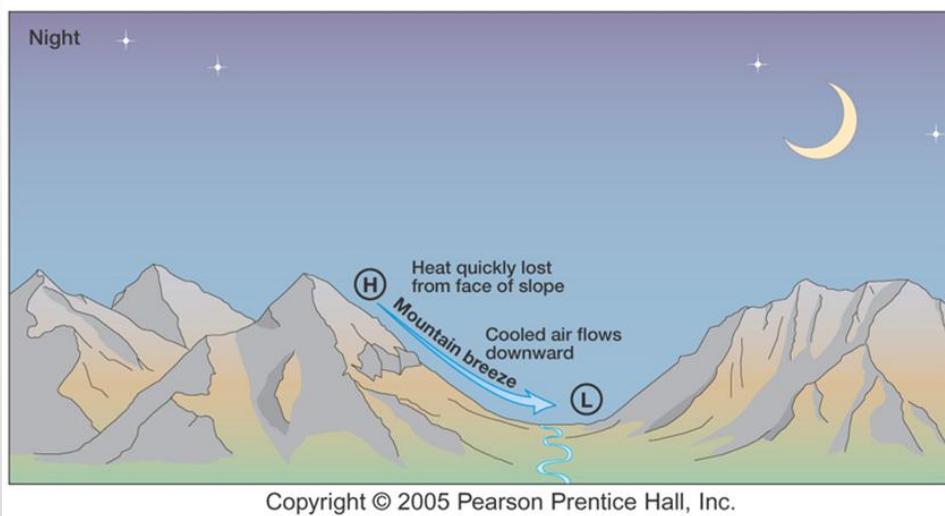
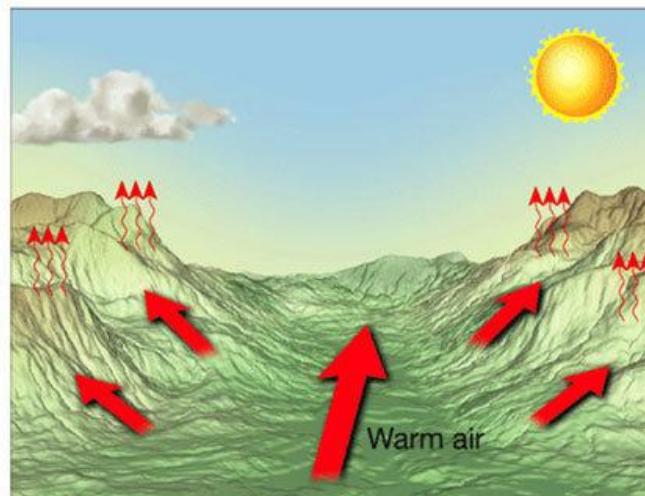
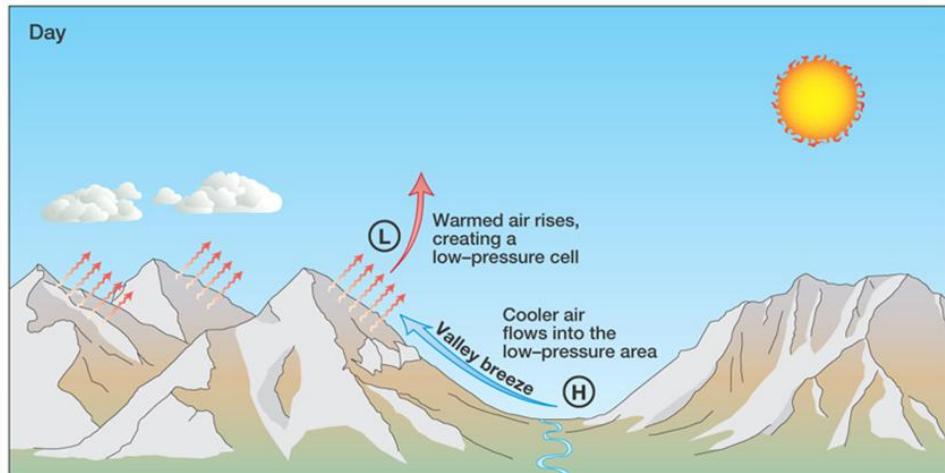
Beaufort Number	Wind Speed (miles/hour)	Wind Speed (km/hour)	Wind Speed (knots)	Description	Wind Effects on Land
0	< 1	< 1	< 1	Calm	Calm. Smoke rises vertically.
1	1-3	1-5	1-3	Light Air	Wind motion visible in smoke.
2	4-7	6-11	4-6	Light Breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	12-19	7-12	Gentle Breeze	Leaves and smaller twigs in constant motion.
4	13-18	20-28	11-16	Moderate Breeze	Dust and loose paper are raised. Small branches begin to move.
5	19-24	29-38	17-21	Fresh Breeze	Small trees begin to sway.
6	25-31	39-49	22-27	Strong Breeze	Large branches are in motion. Whistling is heard in overhead wires. Umbrella use is difficult.
7	32-38	50-61	28-33	Near Gale	Whole trees in motion. Some difficulty experienced walking into the wind.
8	39-46	62-74	34-40	Gale	Twigs and small branches break from trees. Cars veer on road.
9	47-54	75-88	41-47	Strong Gale	Larger branches break from trees. Light structural damage.
10	55-63	89-102	48-55	Storm	Trees broken and uprooted. Considerable structural damage.
11	64-72	103-117	56-63	Violent Storm	Widespread damage to structures and vegetation.
12	> 73	> 117	> 64	Hurricane	Considerable and widespread damage to structures and vegetation. Violence.



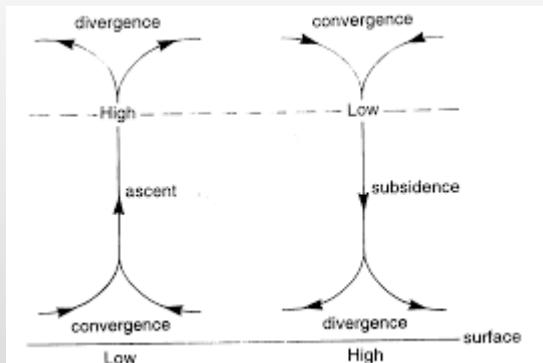
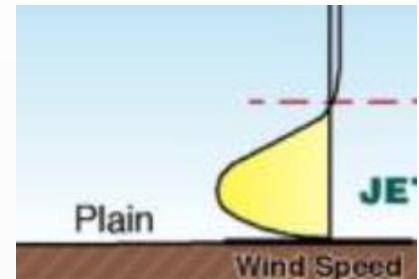
5. Wind – (überregional)



5. Wind (regional/local)



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6. Turbulence

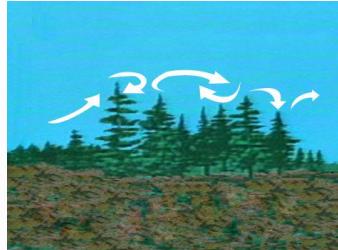
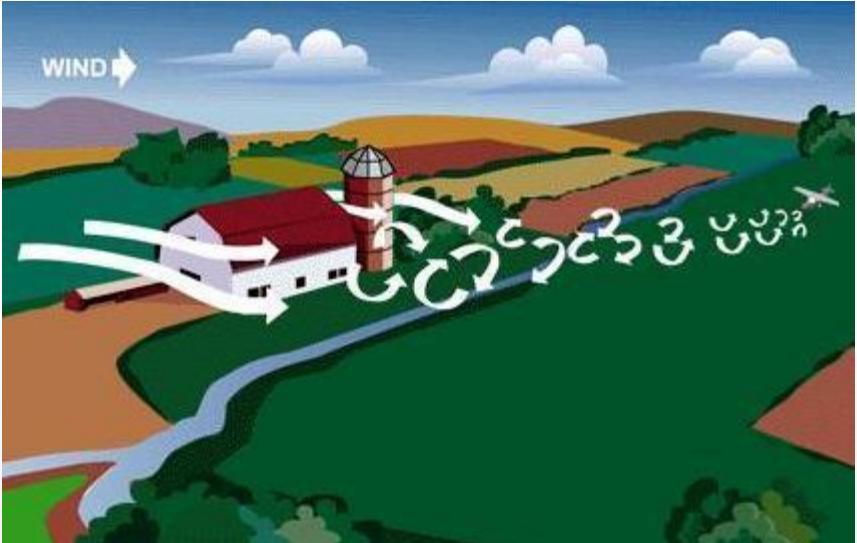
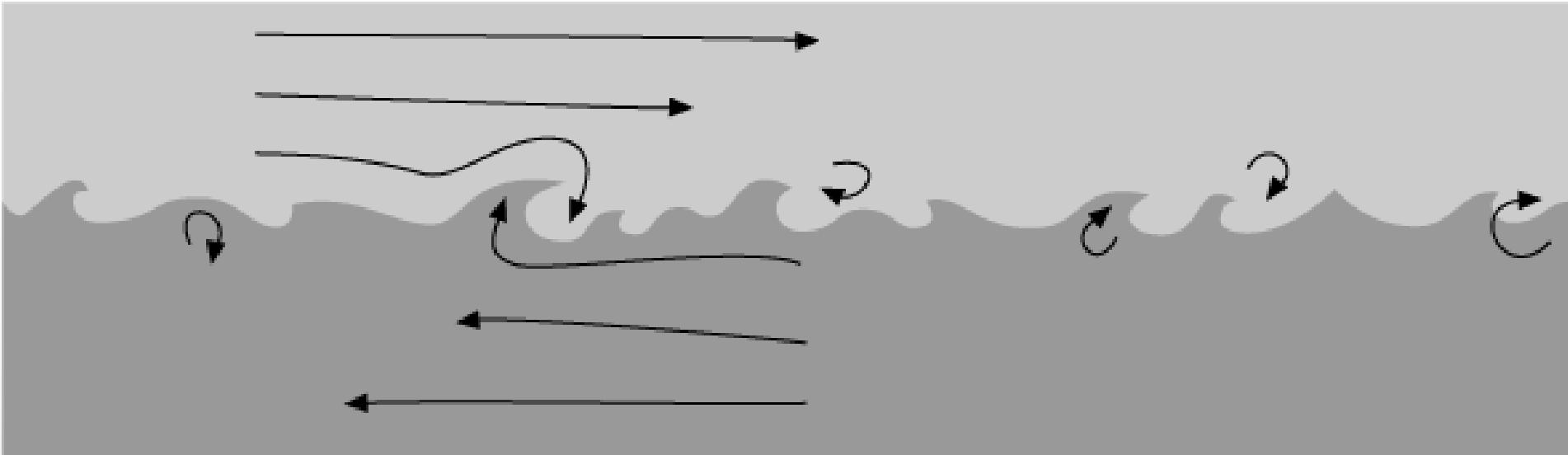
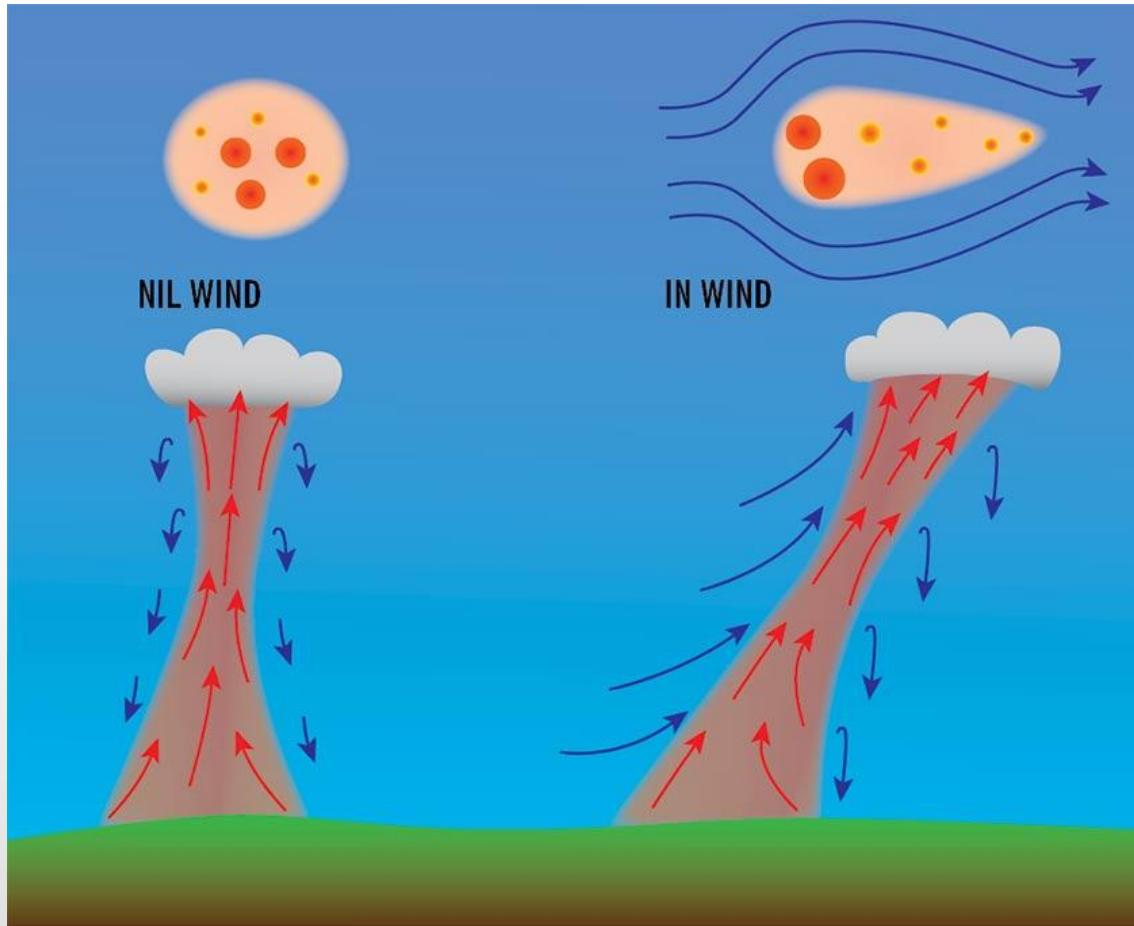


Figure 12-16. Turbulence in mountainous regions.

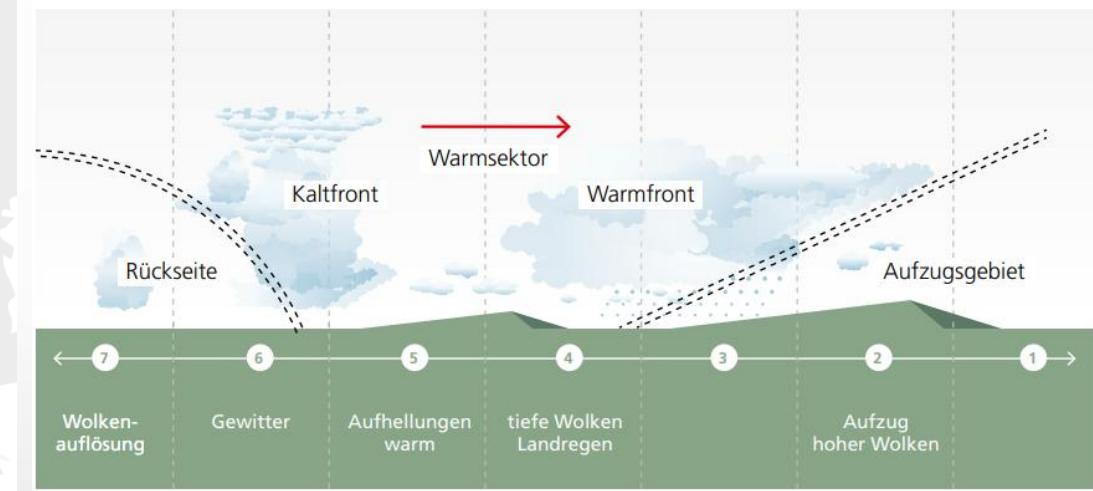
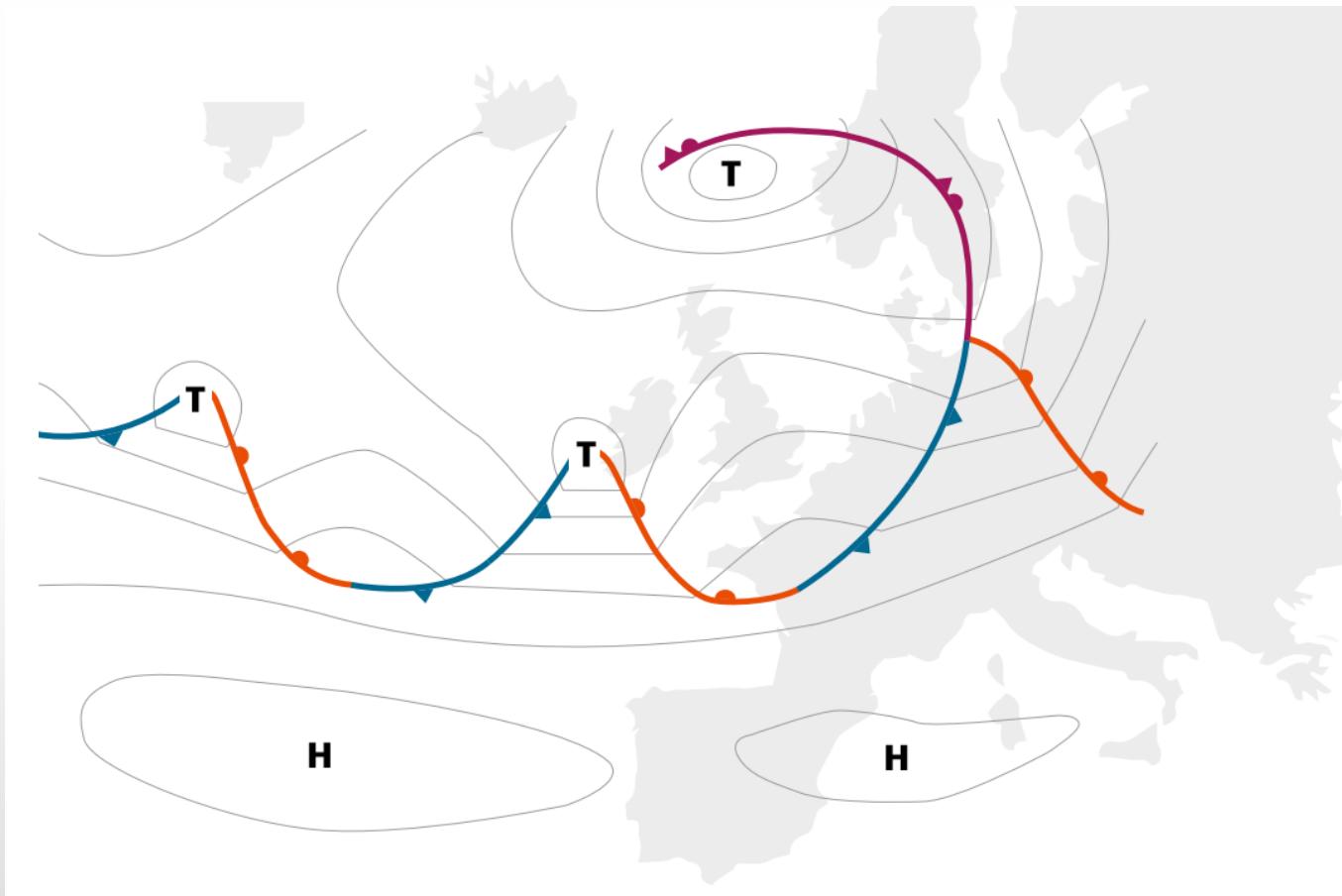
6. Turbulence



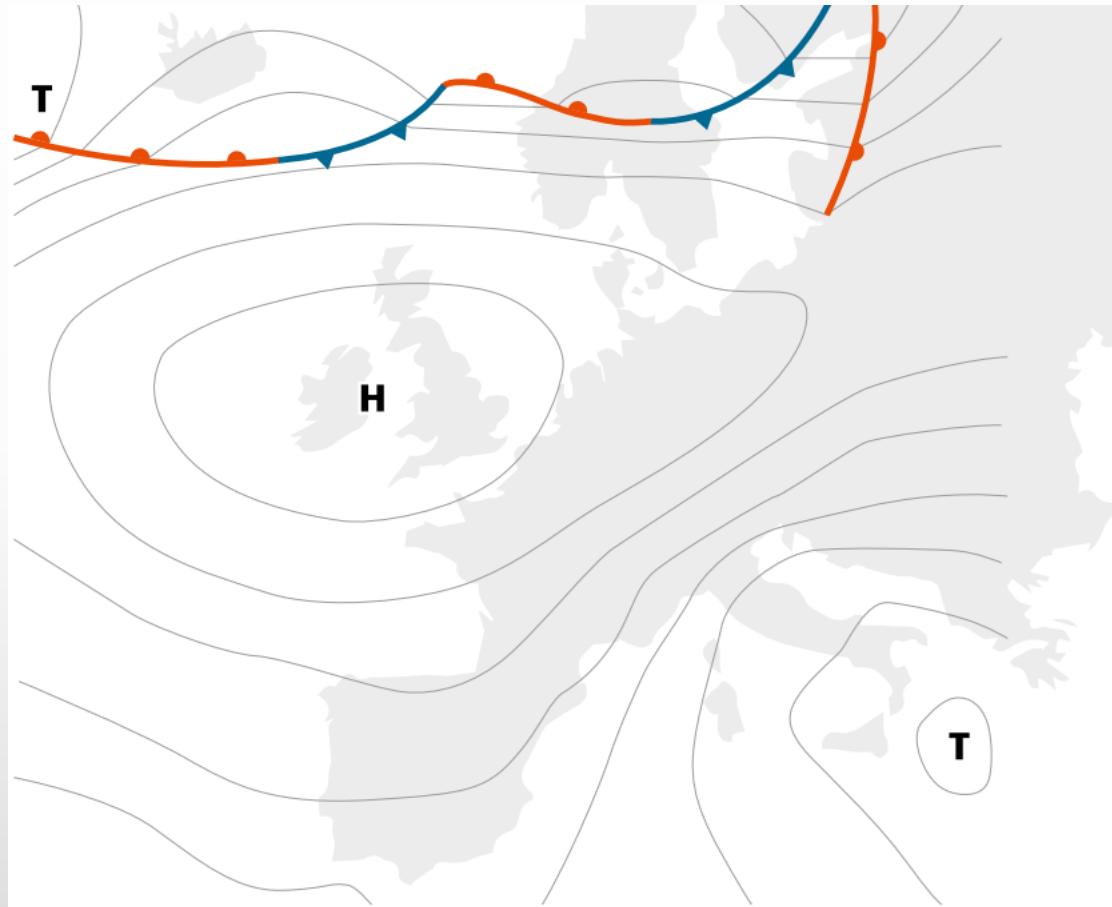
6. Turbulence



7. Typical weather Situations in CH



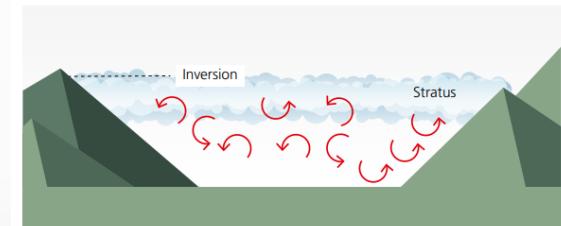
7. Typical weather Situations in CH



Die Schweiz liegt in einer Ost- bis Nordostströmung, die als Bise bezeichnet wird.

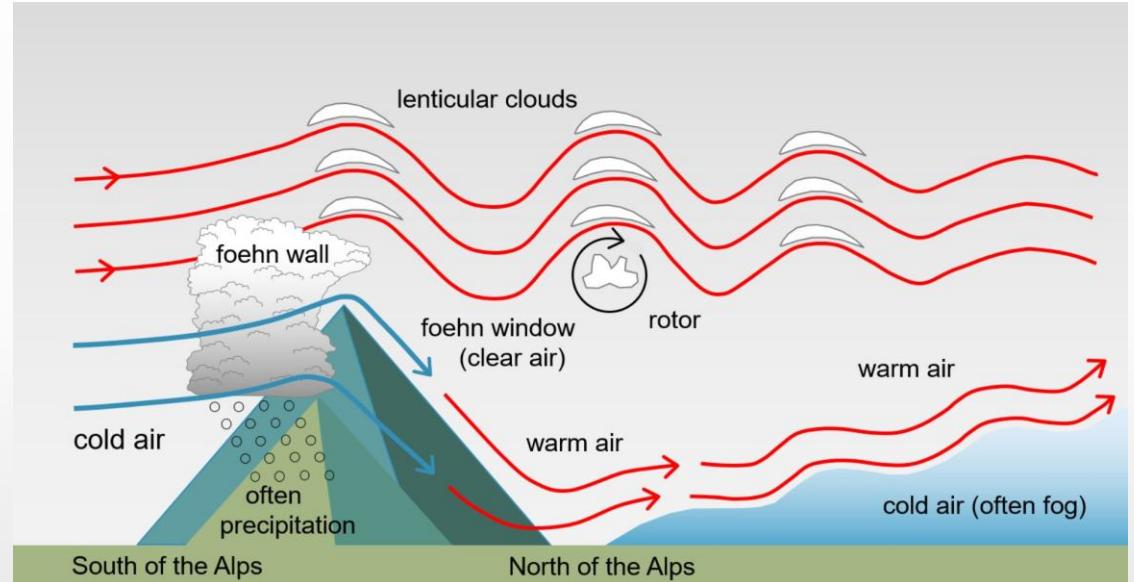
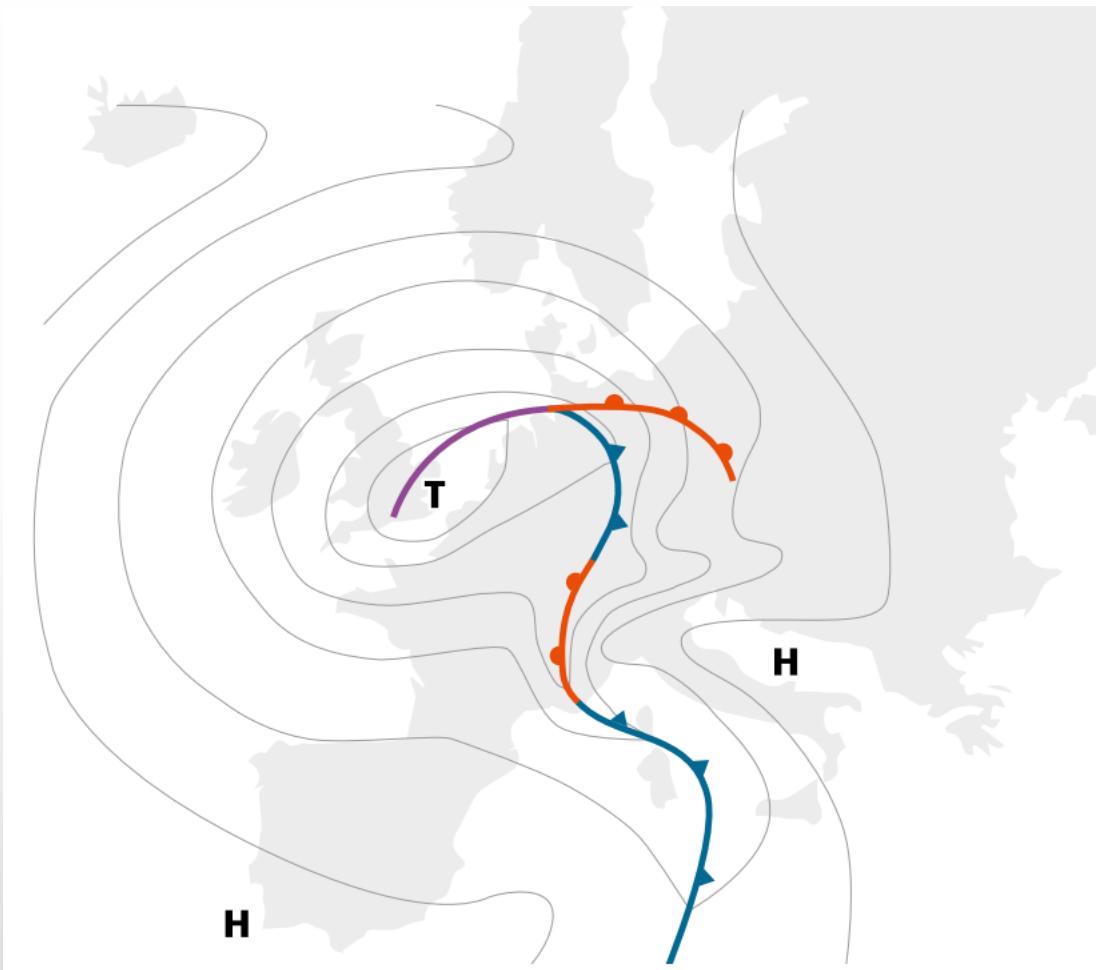


Die Hochnebeldecke überdeckt meist das ganze Mittelland. Die Abbildung zeigt die mittlere Ausdehnung der Hochnebeldecke bei einer Obergrenze von 1100 m ü. M.

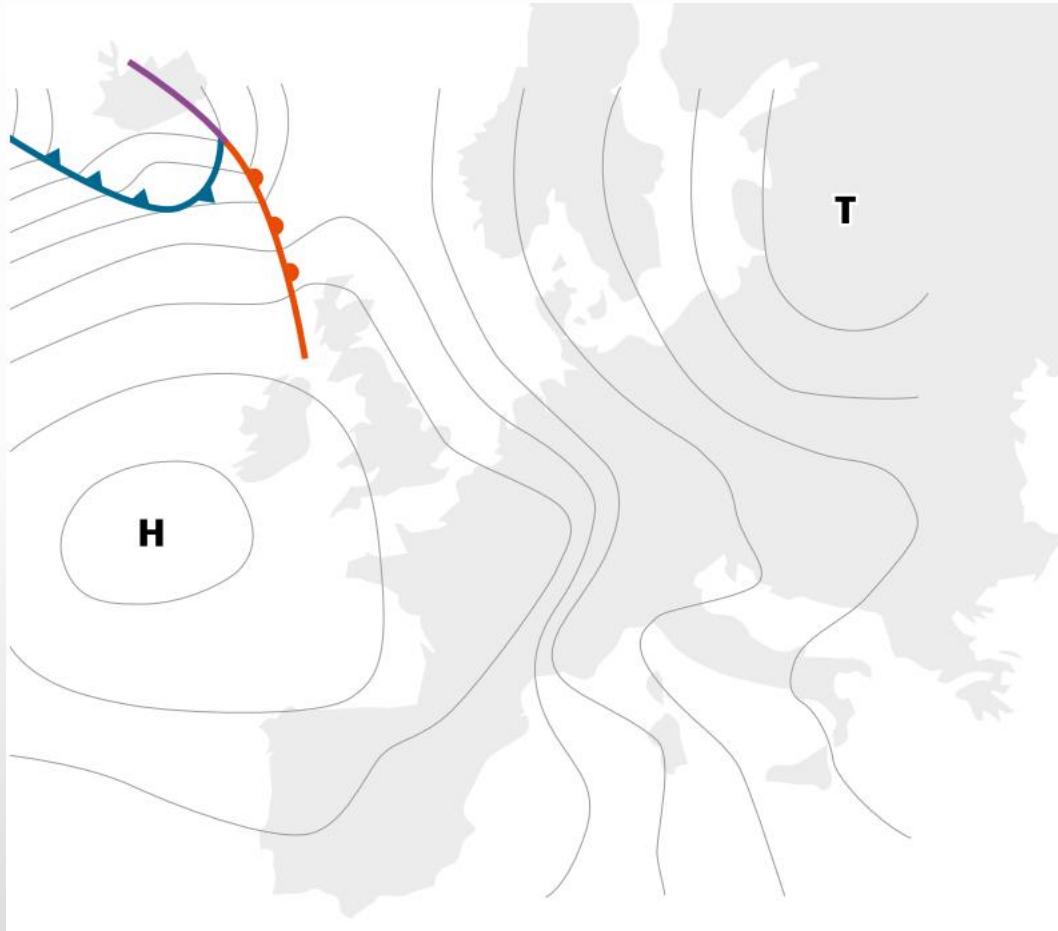


Die Bise durchmischt die im Mittelland liegende Kaltluft, der Nebel löst sich auf. Über der Durchmischung liegt die Hochnebeldecke.

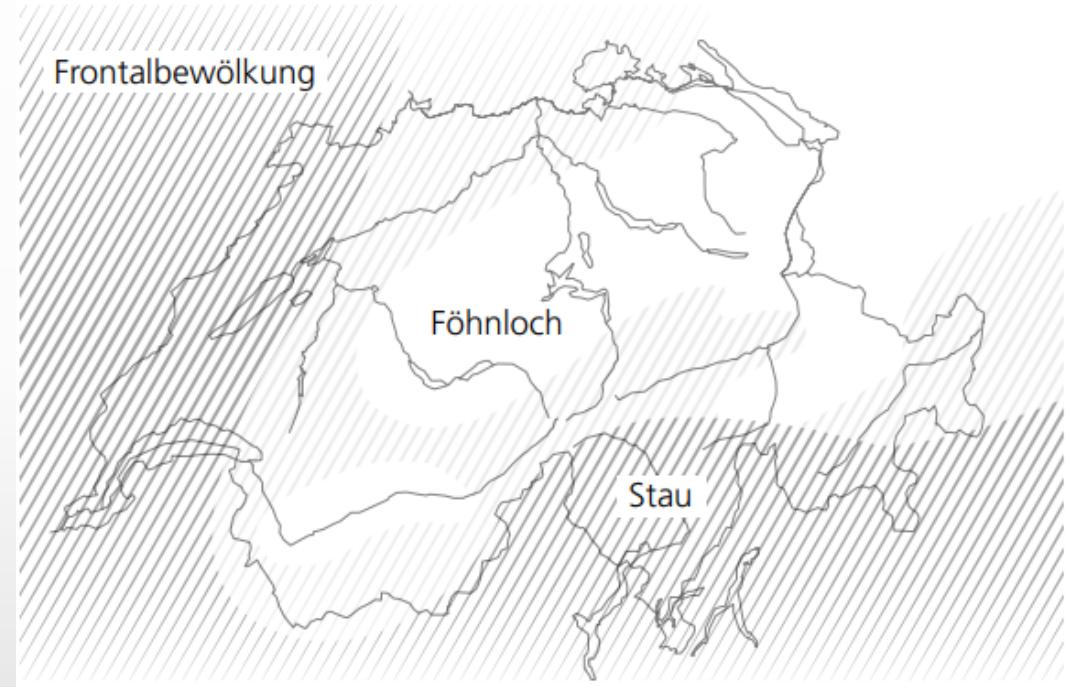
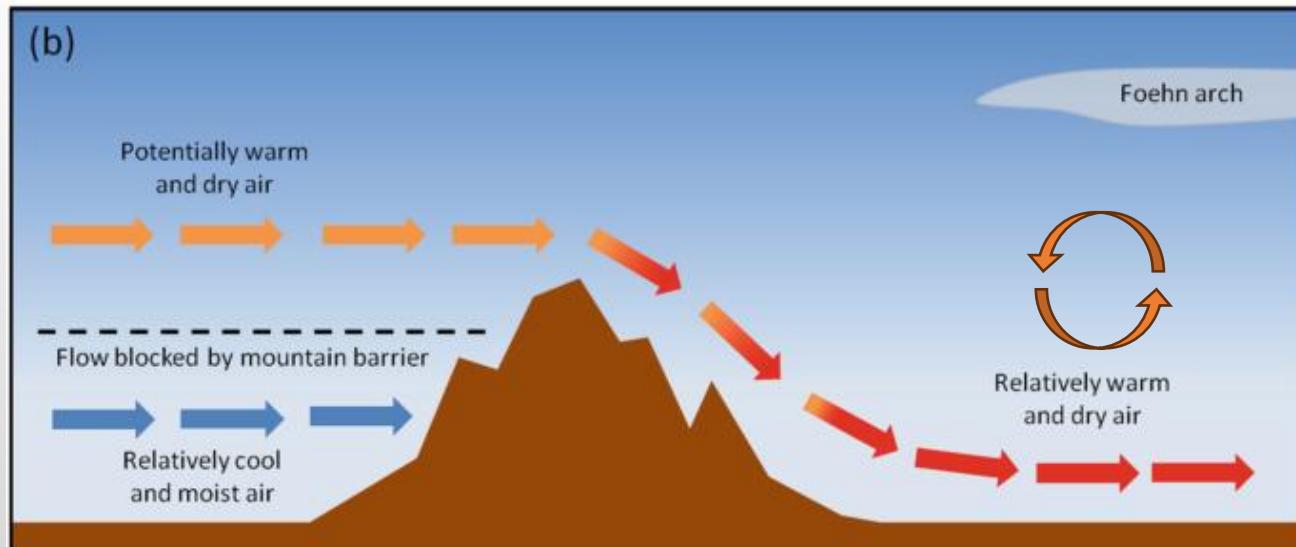
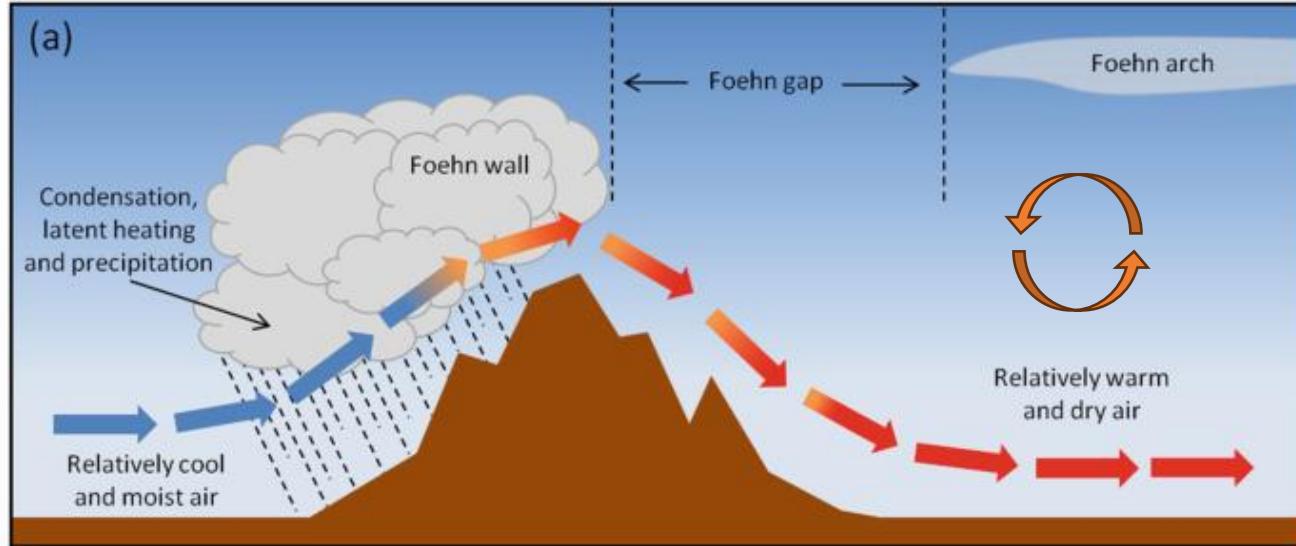
7. Typical weather Situations in CH



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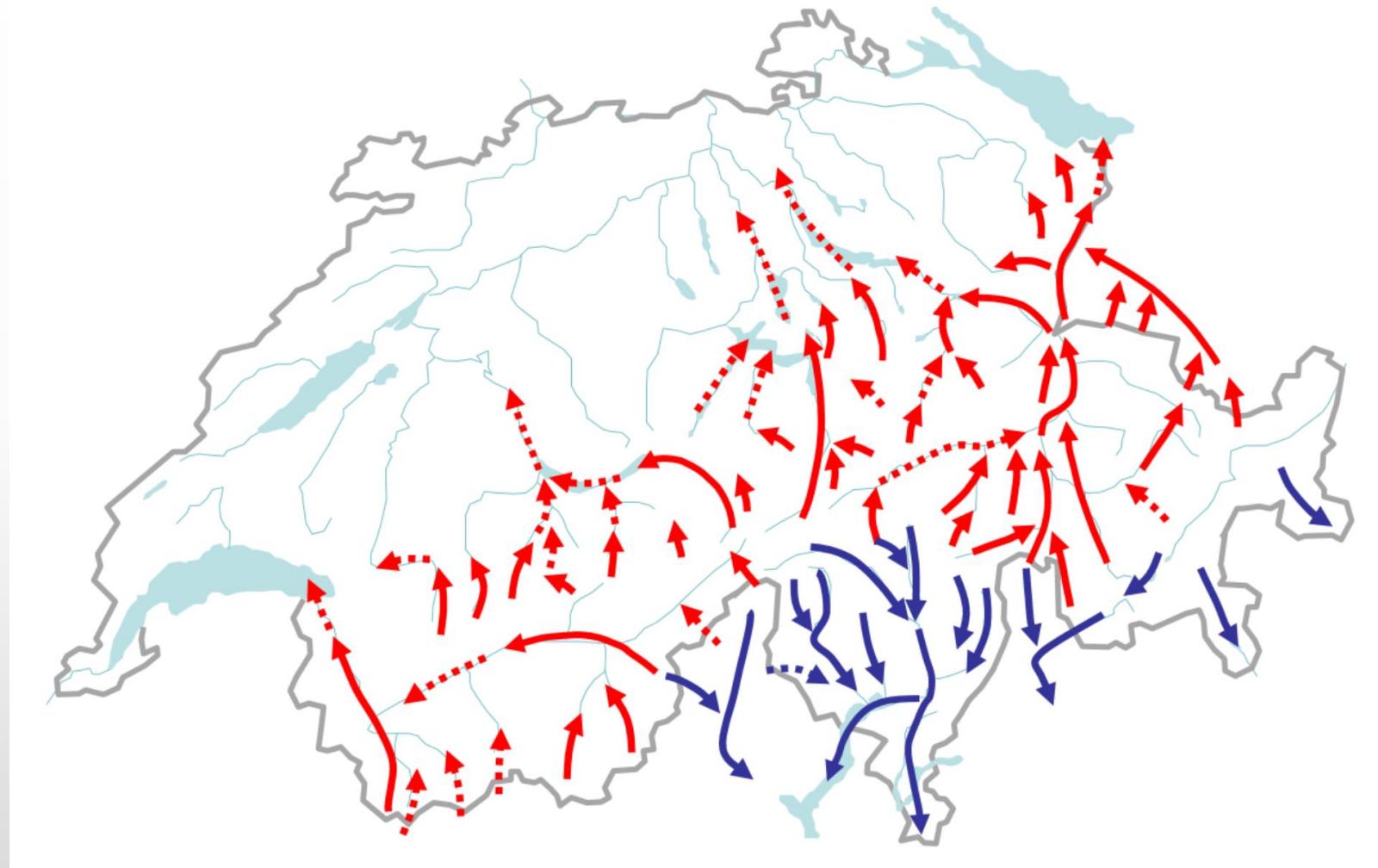


7. Typical weather Situations in CH

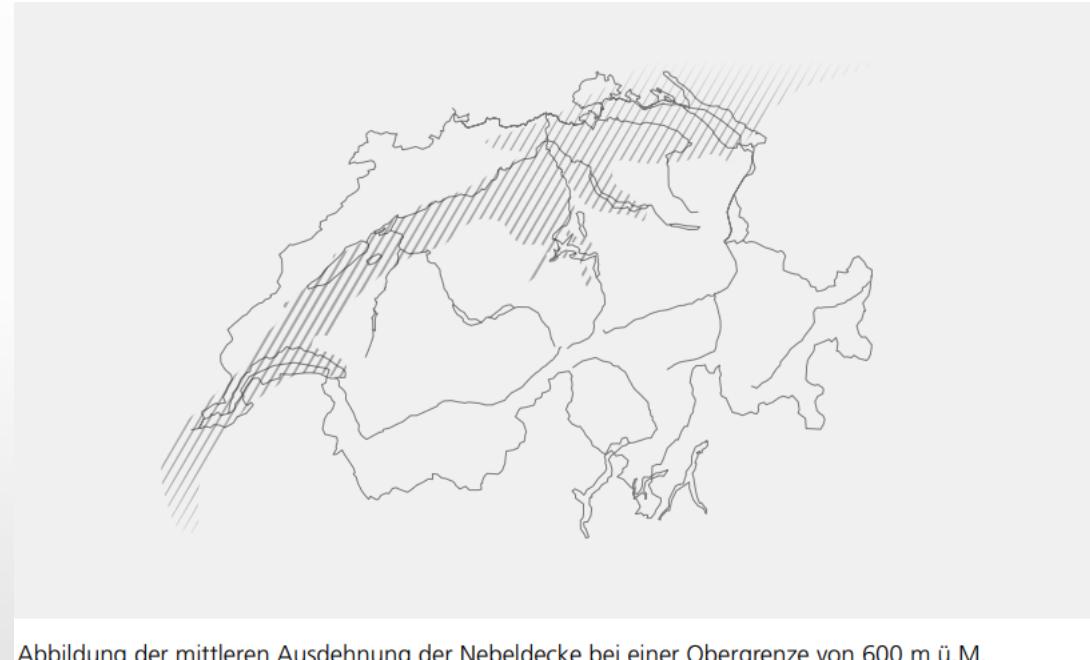
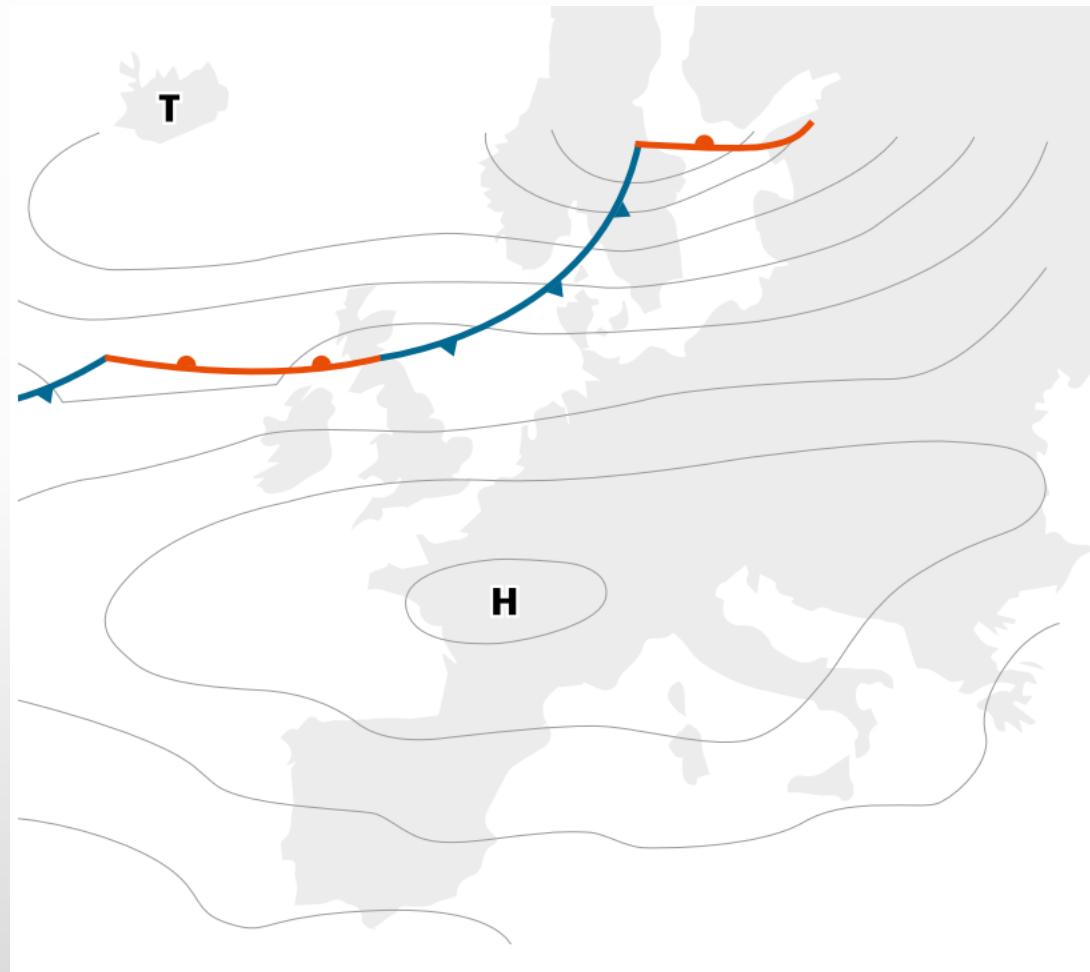


Typische Wolkendecke in der Alpenregion bei Südföhn

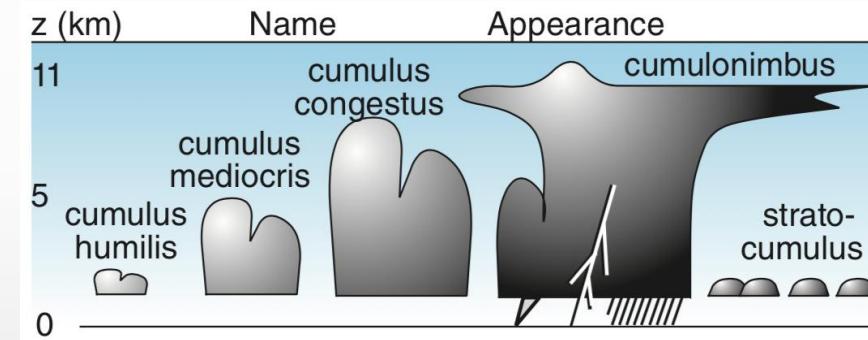
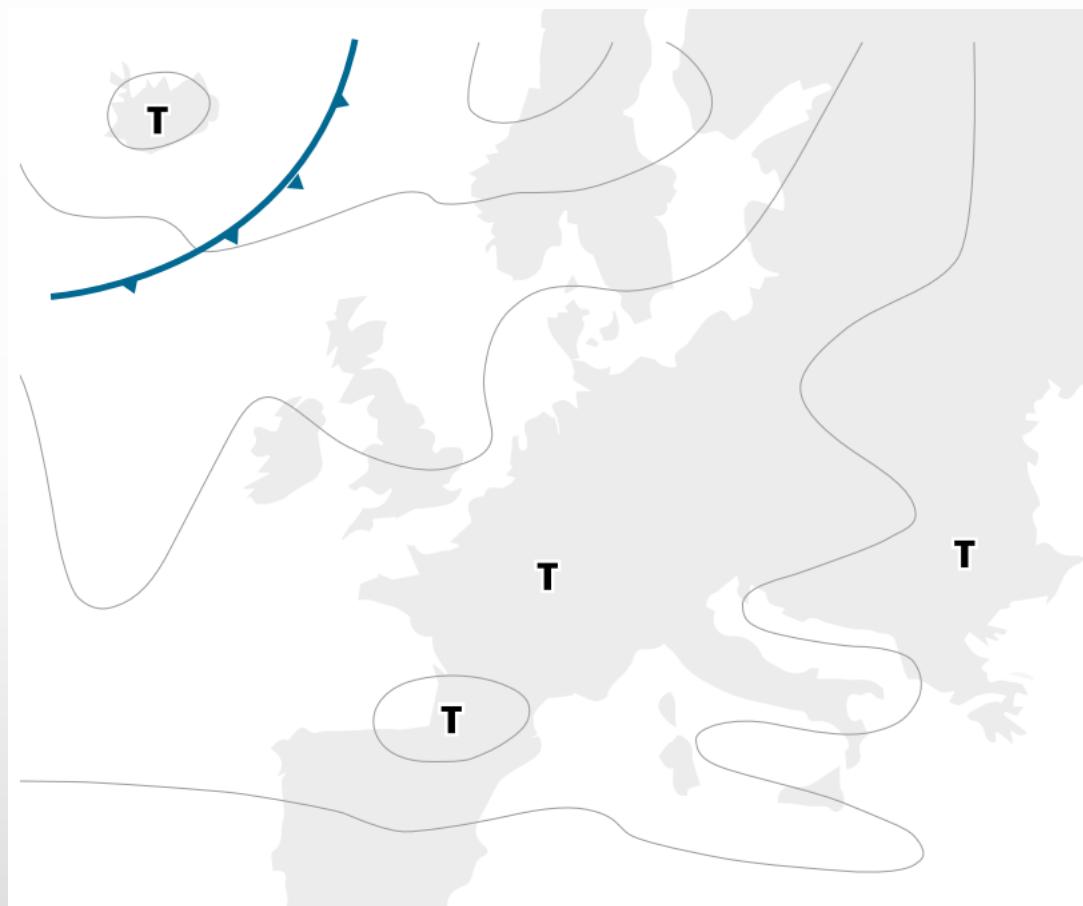
7. Typical weather Situations in CH



7. Typical weather Situations in CH



7. Typical weather Situations in CH



8. Decisionmaking strategy

1. Front
2. Föhn
3. Wind (General/Überregional)
4. Wind (Regional)
5. Thunderstorms (Gewitter)

