Exercise week 9 - Course atmospheric processes

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The exercise today is to analyse the extratropical cyclone "Caetano" which passed over Switzerland last Thursday. You will discuss the exercises below in groups of 4 to 6 persons.

1 Satellite animation

1. Download the satellite animation `Satellite_animation_2024-11-20_00_00-2024-11-22_12_00.mp4`.
2. Read the documentation of the "Airmass RGB" product.
3. Analyse the satellite animation. Do you see any of the weather systems we discussed yesterday (i.e. extratopical cycones, fronts)?
4. Can you identify the different airmasses passing over Switzerland?

2 IFS model data

1. Open the animation `20241126_IFS_run_20241120_00z.mp4` on moodle. It shows on the left panel the 300 hPa geopotential height (contour, labels in decametre) and the 300 hPa wind speed (colours, values in knots, 1 knot=0.5 ms^{-1}). The right panel shows the mean-sea level pressure (labels in hectopascals) and the temperature at 850 hPa. The data comes from the IFS numerical weather prediction model from the European Centre for Medium Range Weather Forecast (ECMWF).
2. Identify the low pressure system that starts to form on 20 November over the North Atlantic
3. What is the position of this low pressure system with respect to the jet streak ?
4. Is it a favorable location for cyclogenesis? Explain your answer based on the material covered during the lecture
5. Identify the cold front, the warm front and the warm sector of the low pressure system on 21 Nov at 12 UTC as it passes over Britanny.
6. At this time step, where do you expect the highest wind speed?
7. Between Nov 21 12 UTC and Nov 22 00 UTC, the low pressure system passes over Switzerland. Analyse the evolution of the warm sector during this time interval

8. On Nov 21 at 18 UTC, the warm front seems to be blocked from its eastward propagation. What could be blocking its propagation? Hint: it is not something we covered in class, but use your geographical knowledge.