Meteorology – Lecture 11

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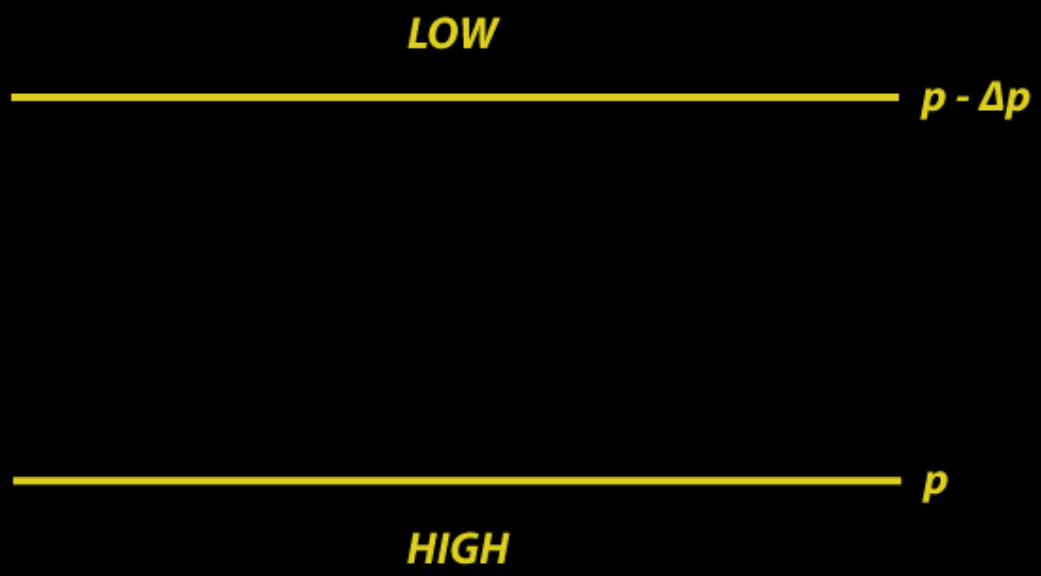
Important notes

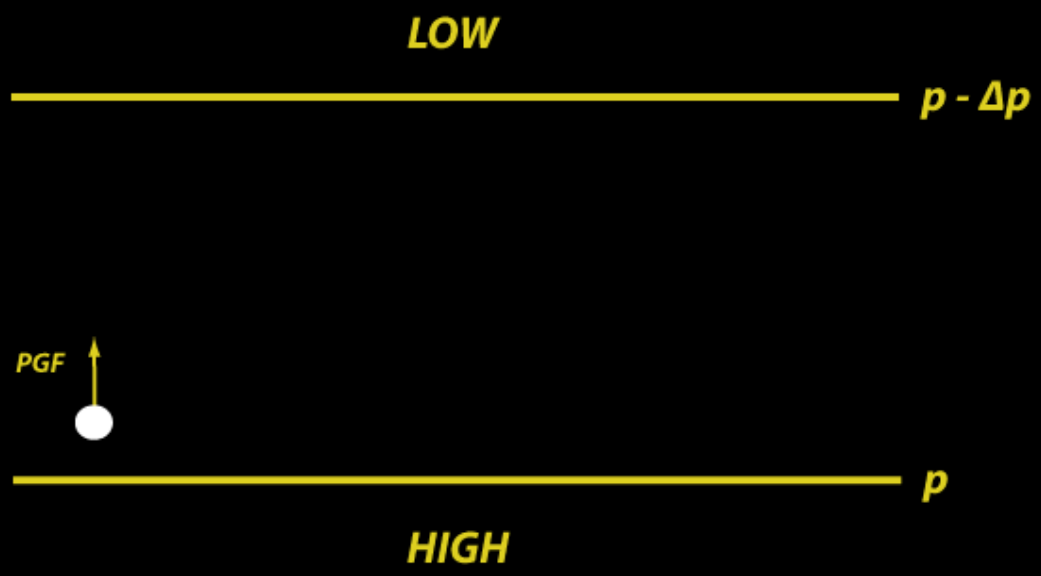
- These slides show some figures and videos prepared by Robert G. Fovell (RGF) for his “Meteorology” course, published by The Great Courses (TGC). Unless otherwise identified, they were created by RGF.
- In some cases, the figures employed in the course video are different from what I present here, but these were the figures I provided to TGC at the time the course was taped.
- These figures are intended to supplement the videos, in order to facilitate understanding of the concepts discussed in the course. *These slide shows cannot, and are not intended to, replace the course itself and are not expected to be understandable in isolation.*
- Accordingly, these presentations do not represent a summary of each lecture, and neither do they contain each lecture’s full content.

Geostrophic balance: PGF and Coriolis

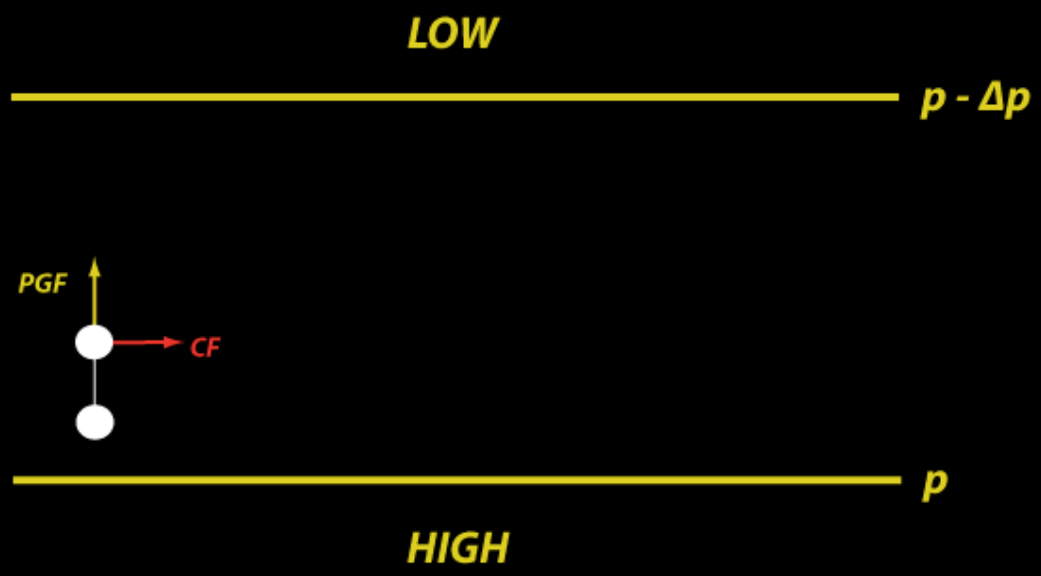
Start with two isobars drawn in a horizontal plane.
Take North at the top of the figure, if you choose.



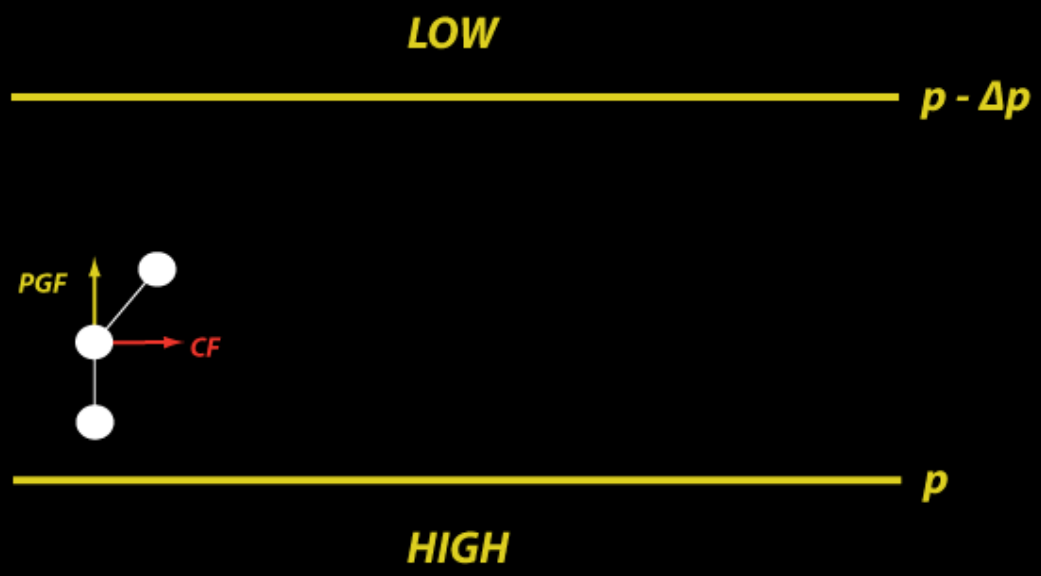
Create an air parcel, but hold onto it for now. The parcel would experience a PGF, directed towards low pressure. Once free to do so, it will start moving towards low pressure.



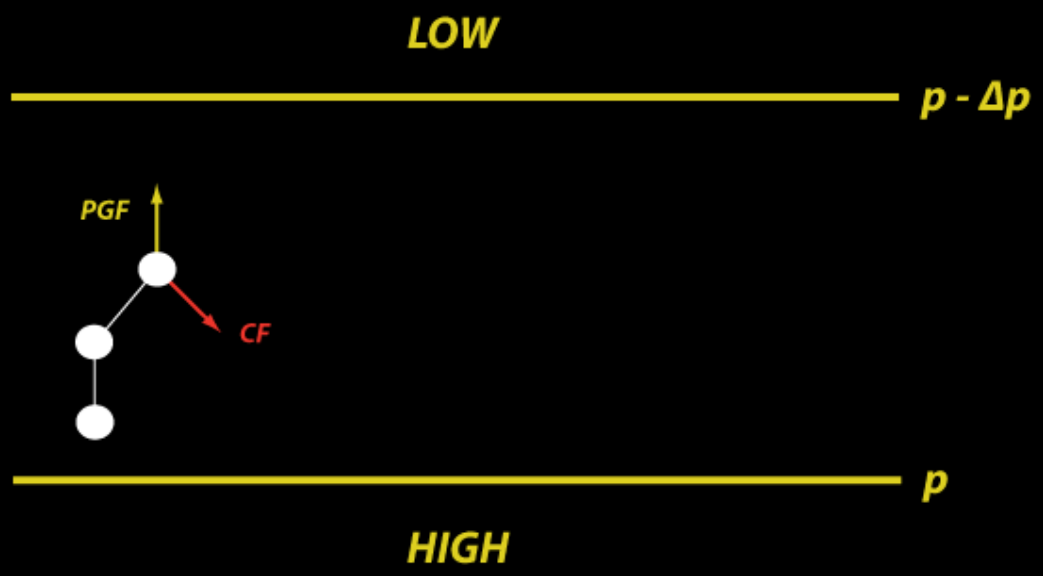
Once in motion, the Coriolis force appears, directed to the right following the motion (in the northern hemisphere).



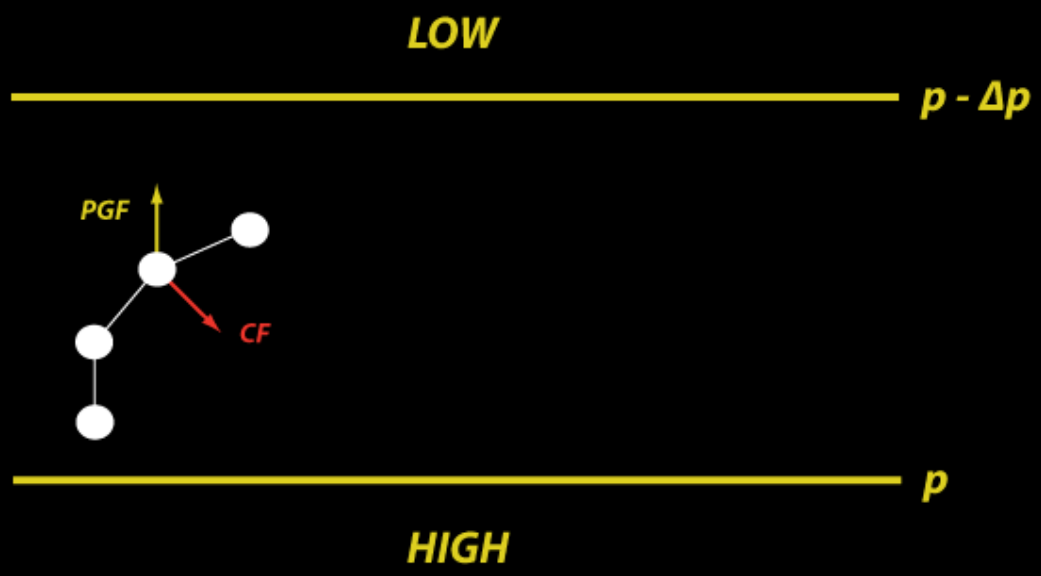
The combination of these two forces will cause
the parcel path to start deviating to the right
so it is no longer moving directly towards low pressure.

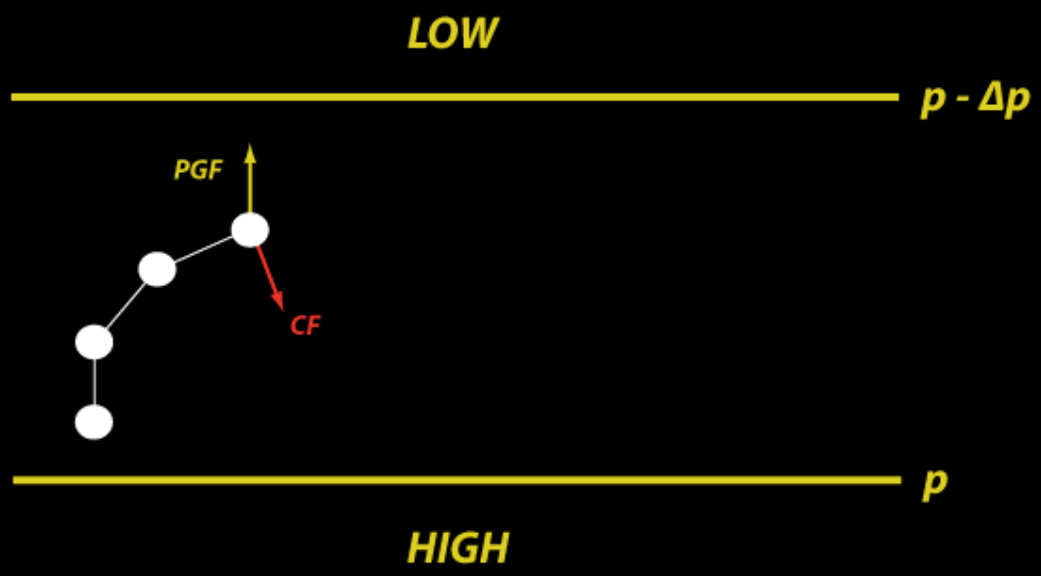


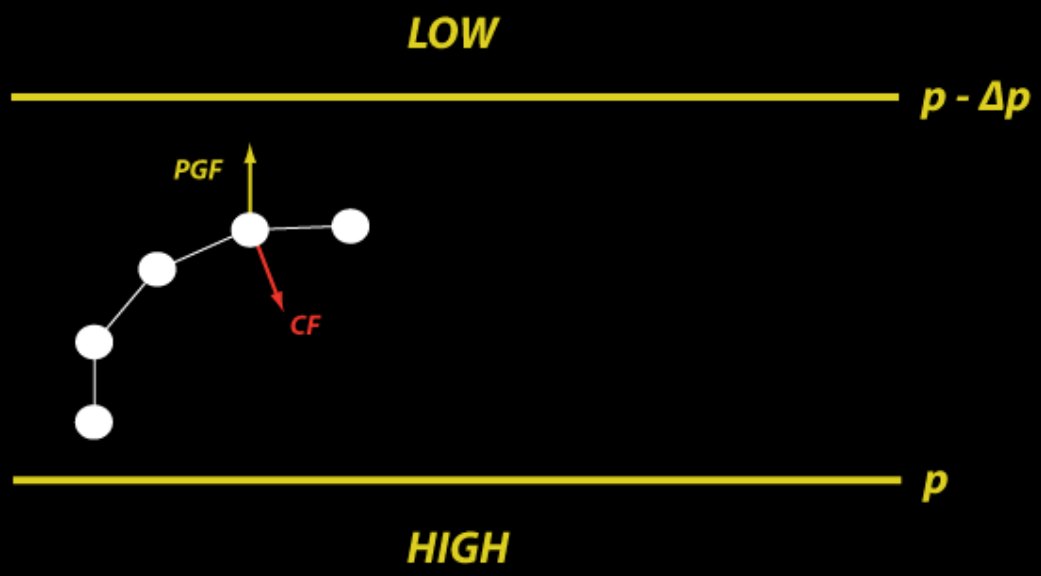
But Coriolis is always directed to the right in the NH. So even though the parcel turns, Coriolis keeps tugging rightward.



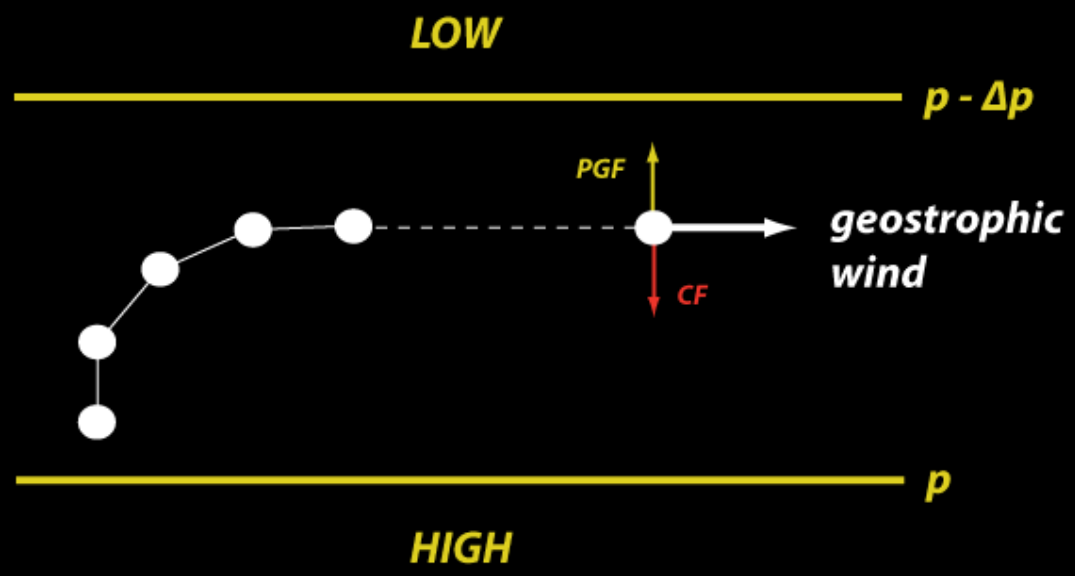
So the turning continues until PGF and Coriolis finally come into opposition.



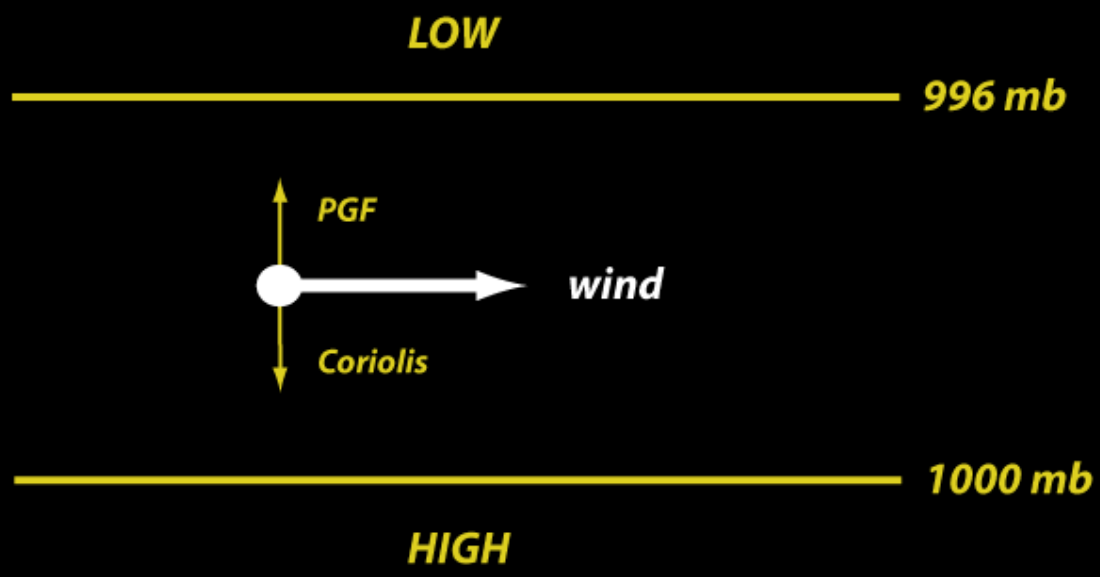

LOW
p - Δp
PGF
CF
p
HIGH


LOW
p - Δp
PGF
CF
p
HIGH

This is the final state, the **geostrophic balance**, in which the air is moving parallel to the isobars.



Isobar spacing



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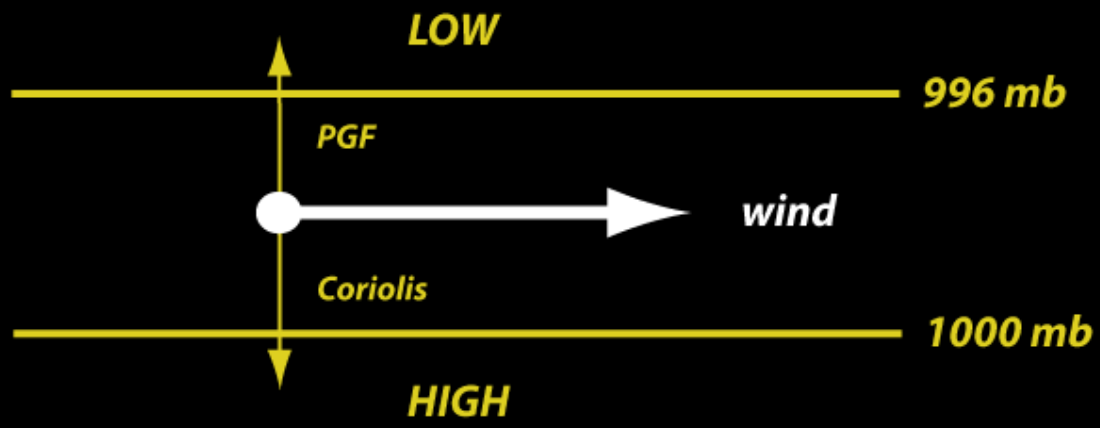

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