

16. Occlusions and Families of Depressions

16.1 The occlusion process

The cold front moves faster than the warm front, gradually overtaking it. The resulting boundary is called an *occluded front* and it gradually extends down from the centre of the depression as the cold front catches the warm front ahead of it as the low pressure system moves in a general eastward direction.

By the time a depression has travelled eastwards across the Atlantic it is usually partly or often fully occluded by the time it reaches the UK.

An occlusion is classified as being *warm* or *cold* depending on whether the air behind the cold front is warmer or colder than the air ahead of the warm front.

The type of occlusion can be recognised on a synoptic chart by the distinct pattern of the fronts.

- If the warm front is an extension of the occluded front it is a warm occlusion.
- If the cold front is an extension of the occluded front it is a cold occlusion.

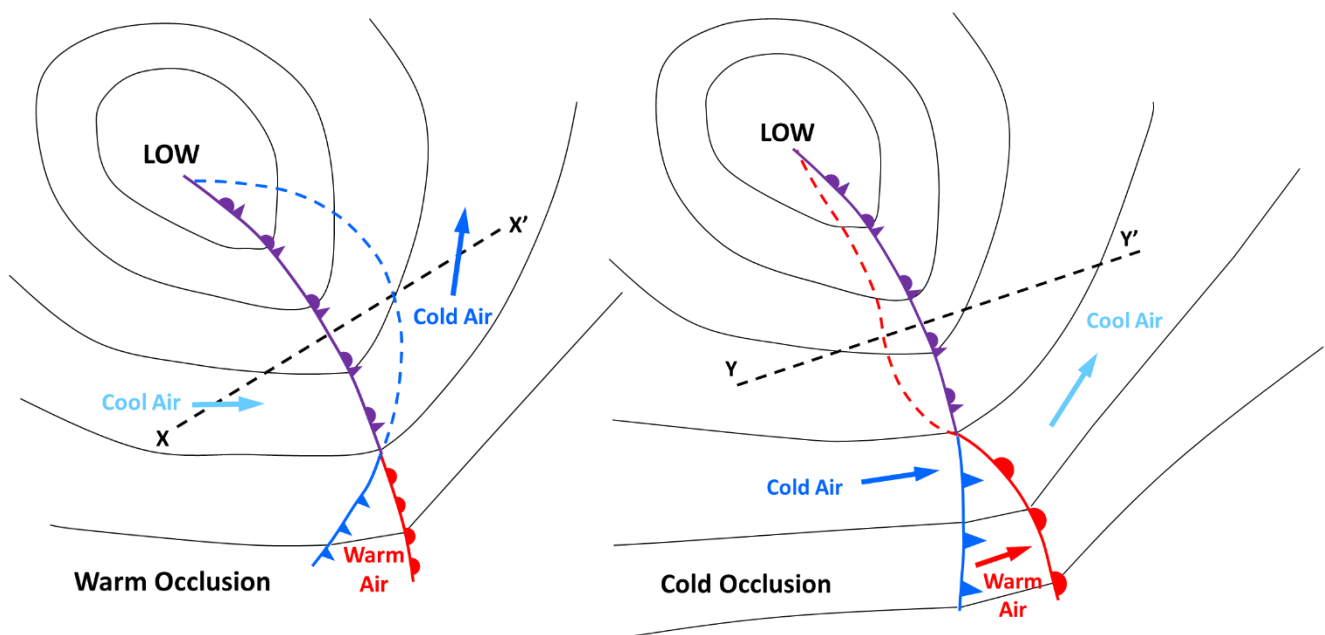


Fig. 16.1 - Warm and cold occlusions.

The source of energy for the development of a frontal depression comes mainly from the supply of air in the warm sector.

Depressions with a wide warm sector will continue to deepen and grow even during the early stages of occlusion.

As the depression occludes and the supply of warm air is reduced development stops. Movement slows at this stage and over a period of a few days the depression *fills*.

The direction and speed of movement depends on the general flow of air over a wide area.

16.1.1 Warm occlusions (winter only)

This occurs in winter only where the Polar air behind the depression is warmer and less dense than that ahead of it.

It is like an extension of the warm front with the original cold front rising up the slope of the original warm front pushing the warm sector ahead of it.

The weather is a combination of both fronts with the main bands of cloud and rain *ahead* of the surface occluded front.

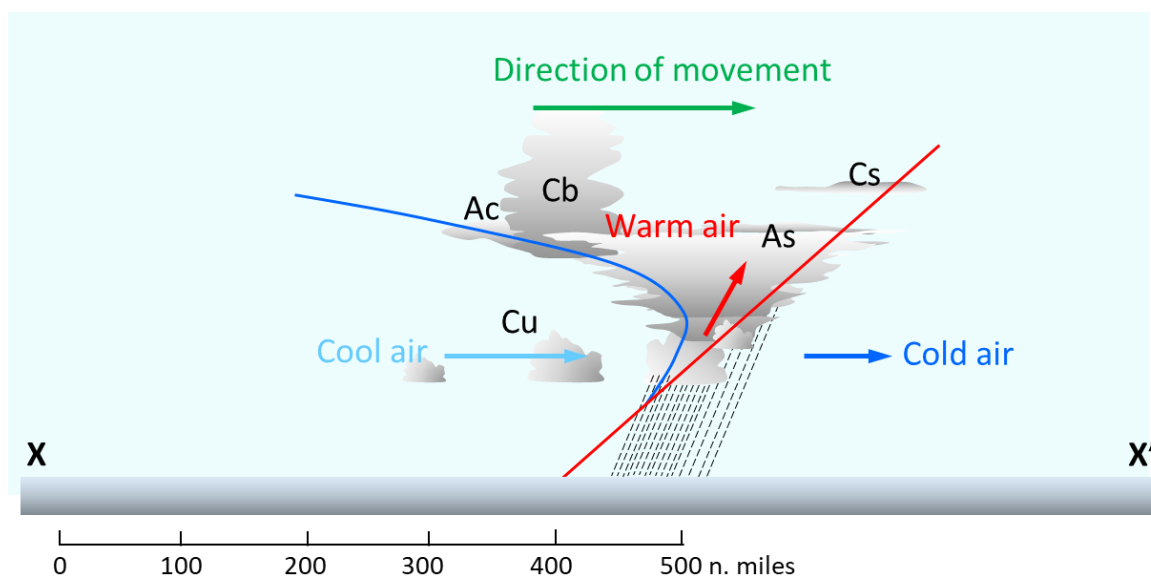


Fig. 16.2 - Warm occlusion (section through XX').

16.1.2 Cold occlusions

This occurs where the Polar air behind the depression is colder and denser than that ahead of it.

It is like an extension of the cold front with the original warm front rising up the slope of the front, lifting the warm sector.

The weather is a combination of both fronts with the main bands of cloud and rain *behind* the surface occluded front. Clouds tend to be less extensive, cumuliform and therefore showery in nature.

These are most common on the eastern side of continents in winter and the western side of continents in summer.

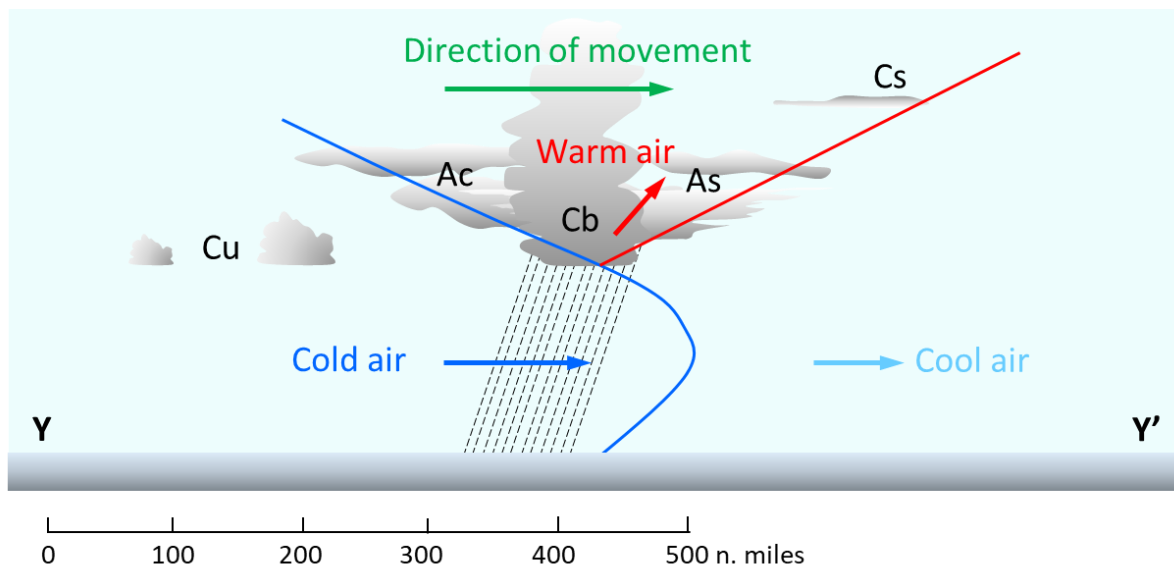


Fig. 16.3 - Cold occlusion (section through YY').

16.2 Family of depressions

The trailing cold front of a depression provides a situation similar to the conditions in which the original depression formed. The original depression is known as the 'primary' or 'parent' depression. A 'secondary' or 'daughter' depression can form on the trailing cold front. Eventually three or four depressions may form a series or *family* of depressions.

The primary depression forms at higher latitudes and then each subsequent depression forms in a lower latitude than its parent. To the rear of the last member of the family, cold air from polar or arctic sources streams into the sub-tropics and through into the trade winds.

This breaks the series.

The depressions are normally separated by ridges of high pressure which bring brief fair intervals (usually of the order of 24 to 48 hours) between the depressions.

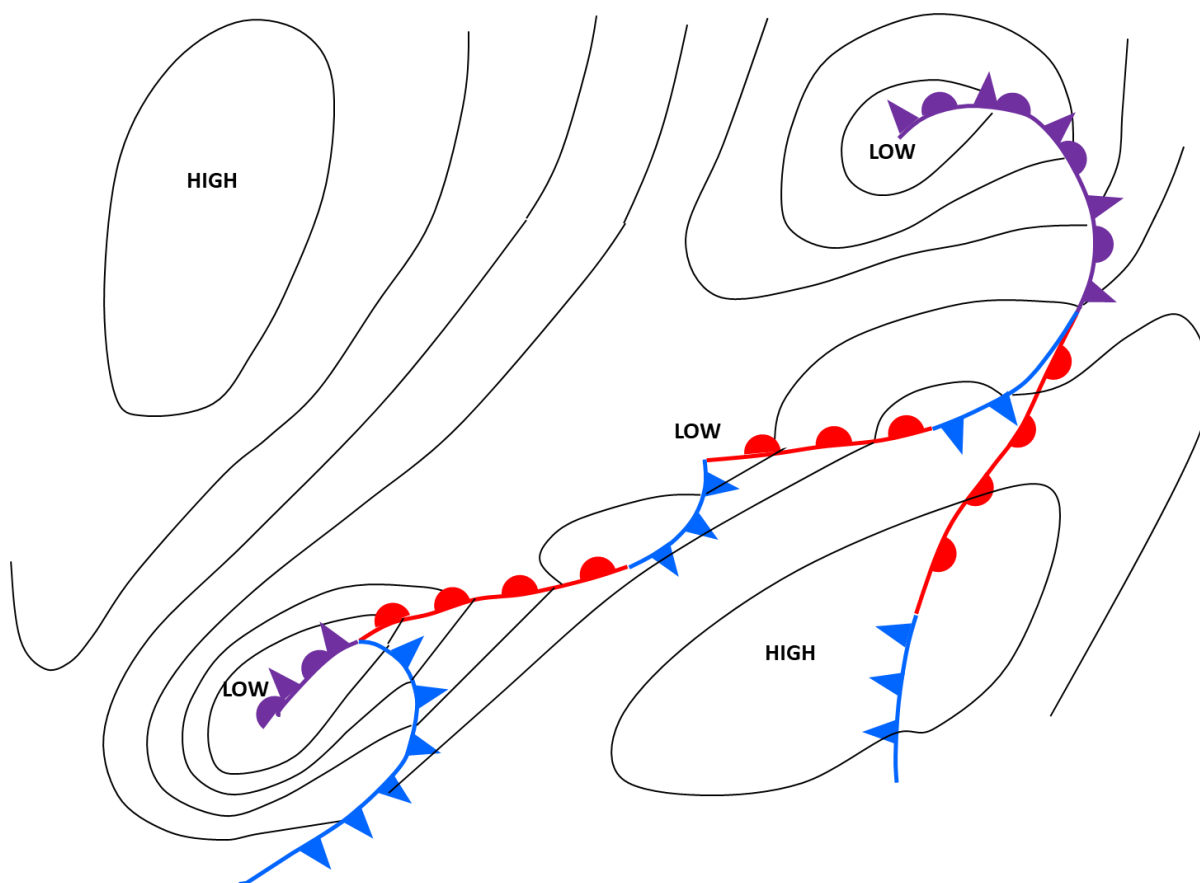


Fig. 16.4 - Family of depressions.