

SAND DUNES: LOCATION AND FORMATION

Sand dunes are a dynamic landform that depends on the inter-relationship between sand and vegetation



Camber Sands, UK



Dunes flamandes, France

WHAT CONDITIONS ALLOW COASTAL DUNES TO DEVELOP?

A good supply of sand

List three qualities of a beach that ensure a good supply of sand:

- a) _____
- b) _____
- c) _____

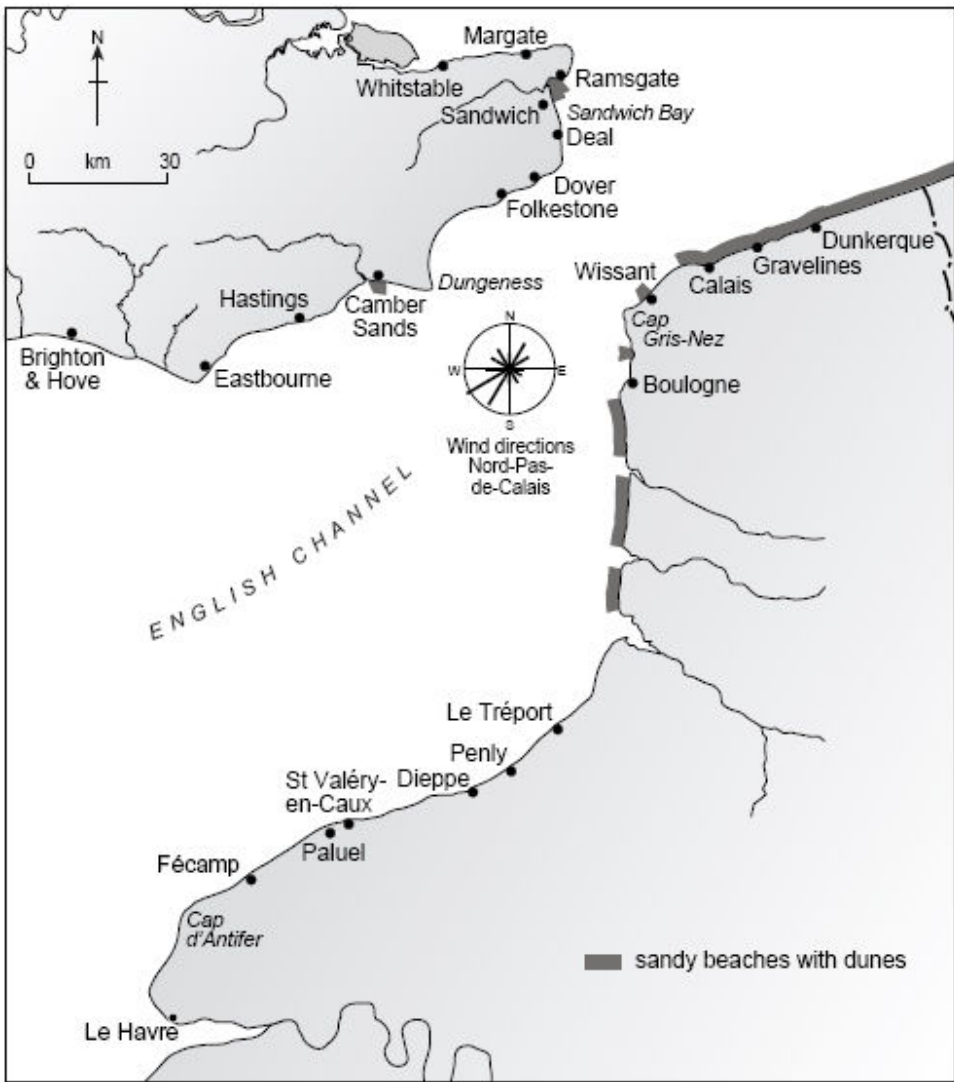


Strong winds blowing off the sea

d) Look at the map below. How does the direction of the winds in relation to the coastlines determine where the dunes occur?

e) If it is so windy, why doesn't all the sand just blow away?

Dune locations in the BAR area:



Note that dunes are much better developed in North France: from the Baie de Somme to Belgium



HOW DO DUNES DEVELOP?

f) Use the information in the box below to complete columns (A), (B), (C) and (D) on the cross section diagram and table that follow on the next page.

As strong winds blow across the beach, the wind may pick up the top layer of dry sand and deposit it in small mounds at the back of the beach, sometimes around seaweed and driftwood at the strandline or the point of highest tide.

These sandy mounds or **EMBRYO DUNES (A)** are very vulnerable to being swept away by wind or waves, but if they remain long enough for plants to begin to colonise, then the sand will stabilise, and further sand accumulation will occur.

As the wind blows more sand inland, the embryo dunes join up to form higher dunes, the **YELLOW or FORE DUNES (B)**. Plants stabilise these dunes so they may eventually reach heights of about 5 metres. These dunes are called yellow dunes because there is still much bare sand between the plants and little humus to darken the sand. Humus is decayed organic material from plant remains and animals. At the same time new embryo dunes form nearer the sea.

Both the embryo dunes and yellow dunes receive new sand supplies and are mobile in that they move gradually inland.

Behind the yellow dunes are often **GREY or FIXED DUNES (C)**, older dunes, cut off from supplies of fresh sand. The vegetation cover is much thicker and there is an increasing amount of humus in the surface sand making it much greyer, and allowing more varied vegetation to develop. These grey dunes are no longer mobile as they are fixed by the vegetation. In North France they may reach heights of 35 or more metres, and in England 20 metres

Behind the grey dunes still older dunes may be covered in woodland. There are good examples in North France, but none in South East England.

Between the lines of dunes are lower areas called **DUNE SLACKS (D)**. These are damper and may have ponds with rushes and other plants favouring the moister conditions, where the water table (the top of the fresh water stored below the ground) is nearer the surface.



Transect of dunes and table below with columns A, B, C, D to be completed

TRANSECT ACROSS COASTAL DUNES

	A	B	C	D
Predominant wind Fresh sand accumulating	Mobile dunes	Fixed dunes	Hollow in dunes
Type of dune	Embryo			Dune slack
% bare sand	80	20	Below 10	
Humus content	Very little	A little accumulating	More humus, making it look grey	High
Water content	A little salt water		Fresh water content slightly higher. Held by humus	
Plants				
Animals				



g) What might be the impact on the dune system of hotter, drier summers, as is probably being caused by global warming?

h) How might increased house building, population growth, and greater demands for water supply from the groundwater affect the dune slacks?

i) Tourists often choose to sit in the embryo dunes at the top of the beach. What might be the impact on the dune system?

