

Intertidal communities

What is the issue?

Climate change may be facilitating the rapid migration of many intertidal species such as *Bifurcaria bifurcate* (a brown seaweed) and acorn barnacle (*Semibalanus balanoides*). Evidence suggests that species range expansion in response to climatic warming is occurring quicker in intertidal areas than in terrestrial systems.

What has happened and how confident?

The MarClim project provided strong evidence that recent climate change has resulted in changes in the abundance, population structure and biogeographic ranges of a number of intertidal indicator species around the UK and Ireland.

Compared with terrestrial systems, the extension of southern intertidal species northwards and eastwards towards the colder North Sea is occurring much more rapidly, at rates of up to 50 km per decade. This rate far exceeds the global average of 6.1 km per decade observed in terrestrial systems.

Some warm water invertebrates and algae show continued increases in abundance and have extended their ranges around northern Scotland (e.g. *Gibbula umbilicalis* and *Chthamalus montaguī*) and eastwards along the English Channel (e.g. *Bifurcaria bifurcate* and *Osilinus lineatus*) over the last 20 years (Mieszkowska *et al.*, 2008).

In the United Kingdom, it is likely that northern range extensions have occurred in response to climatic warming, increasing reproductive effort and juvenile survival success, allowing these species to establish on suitable habitats. Eastward range extensions have occurred due to a combination of the proliferation of artificial sea defences along this coast providing suitable habitat where none was previously present and greater recruitment success of southern species in response to climatic warming.

Cold-water species such as the acorn barnacle (*Semibalanus balanoides*) and dabberlocks alga (*Alaria esculenta*) have continued to decrease through the period 2001–2007 (Mieszkowska *et al.*, 2008) but the rate of recession is not as fast as the rate of advancement in southern species.

What might happen?

In the short term, different rates of extensions and retreats will increase diversity close to biogeographical boundaries but in the long term will return to previous levels as northern retractions lead to different species compositions becoming established.

Continued extension and retraction of ranges would be expected in the future with rising temperatures. Projected changes in sea level and storms may have important indirect impacts as the building of more sea defences would allow intertidal species to unnaturally extend their range by acting as artificial rocky shores (Mieszkowska *et al.*, 2008).

Are there any OSPAR regional differences?

Long-term time series around UK and Republic of Ireland show extensions of ranges of intertidal species (e.g. figure 3.2.4. from (Herbert *et al.*, 2003)) over the last five decades in OSPAR Regions II (Greater North Sea) and III (Celtic Seas).

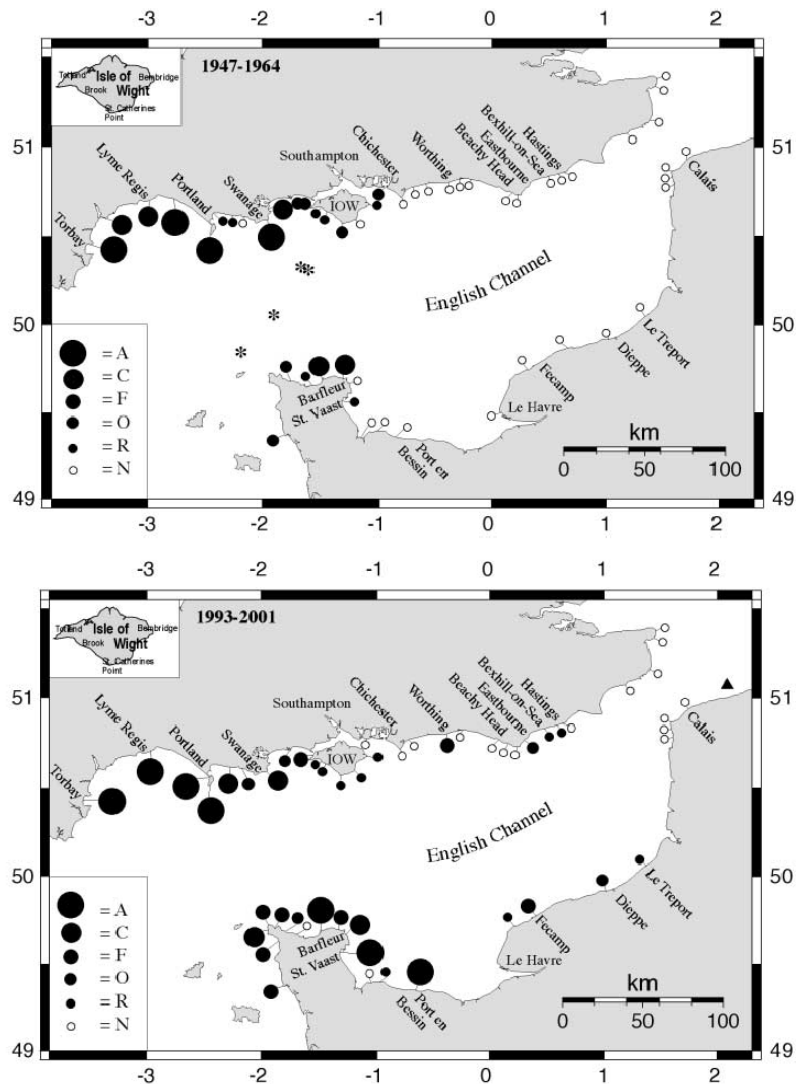


Figure 3.2.4. Demonstration of the shifting range of intertidal species along the English Channel coast. Reproduced from (Herbert et al., (2003)). Original caption: Distribution of *Balanus perforatus* in the eastern English Channel, excluding Channel Islands. Above maximum abundance measured between 1947 and 1964 (Crisp and Southward, 1958; A.J.S., personal observation). For abundance scale see Table 1. * denotes records from the SV 'Manihine' (BMNH collection). Below, intertidal distribution between 1993 and 2001. Black triangle indicates sublittoral record from Dunkirk in 1982 (Davoult et al., 1993).

➔ [Go to the full QSR assessment report on impacts of climate change \(publication number 463/2009\)](#)

References

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