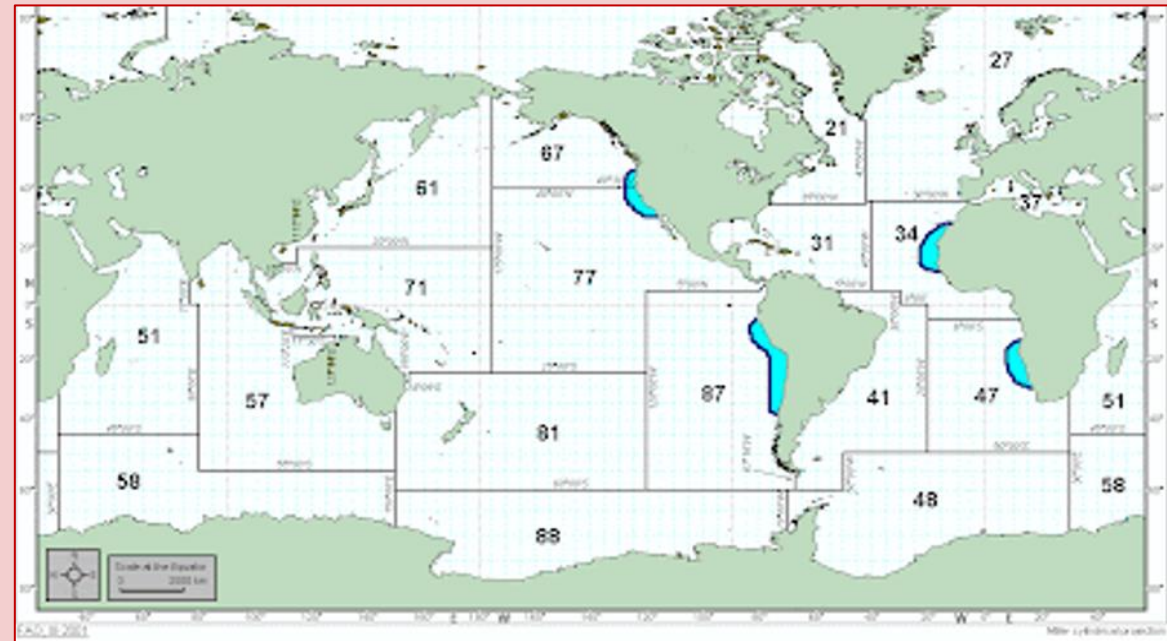


Upwelling: the case of Morocco's coasts

- ▶ Upwelling refers to the rise of cold waters from the depths to the surface, driven by marine winds in conjunction with Earth's rotation (Coriolis effect).
- ▶ These cold waters, originating at depths of 100 to 300 meters, are rich in nutrients, notably mineral salts. Such elements strongly increase the biological production of coastal zones where this phenomenon occurs, thus supporting the entire food chain.
- ▶ Upwelling areas only cover 3% of ocean surfaces but yield 40% of global fishery catches (1).
- ▶ They are located on four major currents: the Benguela Current (Angola, Namibia, South Africa), the Canary Current (Morocco, Mauritania, Senegal, Gambia), the Humboldt Current (Peru and Chile) and the California Current (United States and northern Mexico) (2).

Main upwelling areas



Source: Institut de la Recherche pour le Développement - France

Upwelling: the case of Morocco's coasts

An asset for Morocco

- ▶ Morocco's maritime territories rank among the world's richest in fish, particularly those along the Atlantic coast, where upwelling occurs (3).
- ▶ The Moroccan Atlantic coastline enjoys coastal waters brought by the Canary Current. Upwelling in this region is one of only four major global ocean upwellings. It extends from the Iberian Peninsula to Guinea.
- ▶ Main upwelling areas on Morocco's coasts extend:
 - ❖ from Cape Spartel (Tangier) to Cape Blanc (Lagouira) around Larache;
 - ❖ from Sidi Ifni to Cape Ghir;
 - ❖ from Sidi Ifni to Tarfaya;
 - ❖ from Boujdour to Dakhla.
- ▶ Southern Morocco is a region of almost year-round upwelling, as the winds blow constantly (4).
- ▶ Morocco's coastline can therefore be split into four zones:
 - ❖ Two deep water upwelling areas on the surface, rich in mineral matter. These are on the coast between Cape Ghir (Oualidia) and Cape Juby (Dakhla).
 - ❖ Two high-productivity areas rich in organic matter, located south of the upwelling areas.
- ▶ These upwelling areas, extremely rich in phytoplankton and fishery resources, are considerably anthropized. They are therefore subject to strong variations and threatened by climate change impacts and various forms of pollution.

Upwelling effect: the case of Morocco's coasts

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