THE REGIONS STUDIED BY REFINE

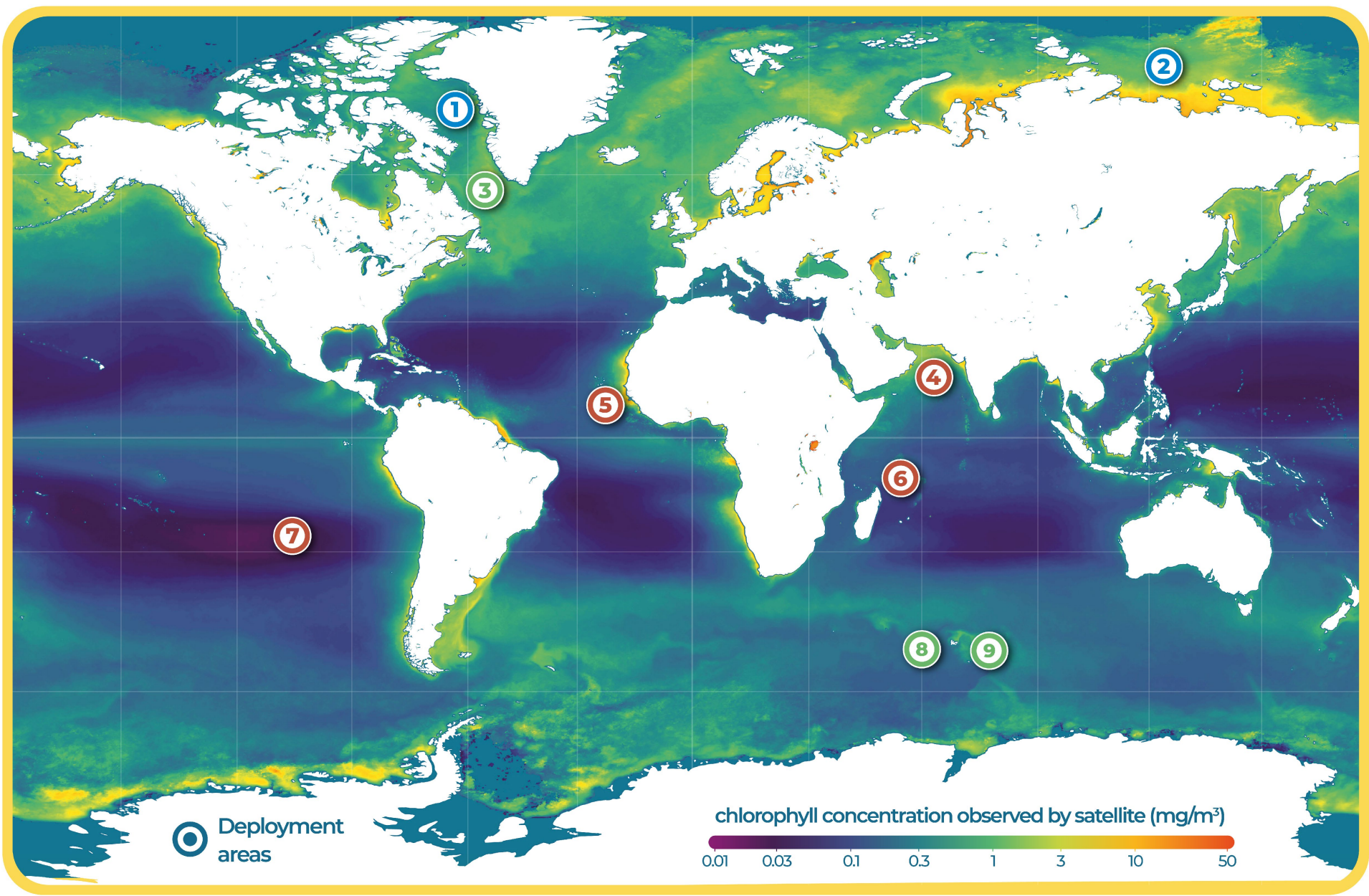
representative of the World Ocean

Observation of phytoplankton development helps us to study the processes involved in the biological carbon pump. For this reason, the REFINE project targets regions that are diversified in terms of the environmental conditions governing phytoplankton life.

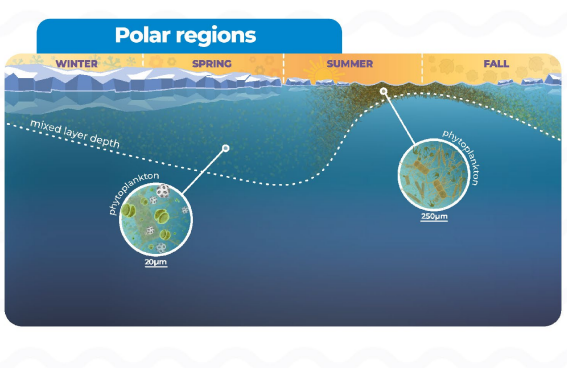
A green Ocean?

REFINE profiling floats explore these regions to enrich our knowledge about the Ocean's carbon sequestration phenomena. **These different study zones have their own particularities that influence the growth of phytoplankton.** Growth is greater or lesser depending on the geographical latitude, season and depth. **Since biological carbon pump activity is closely linked to phytoplankton growth, it will also differ depending on the region studied.**

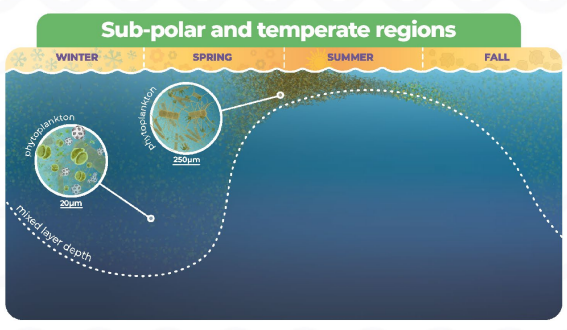
Phytoplankton has a pigment called **chlorophyll**, responsible for its green colour and allowing it to perform photosynthesis. By measuring the concentration of chlorophyll in the water, we get an idea of the quantity of phytoplankton it holds: **the more chlorophyll there is, the richer the water is in phytoplankton.**



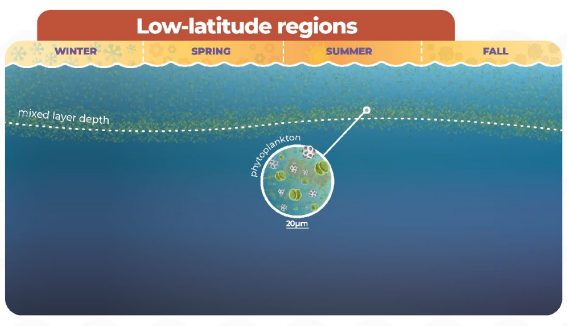
1. **BAFFIN BAY**
2. **LAPTEV SEA**
3. **LABRADOR SEA**
4. **ARABIAN SEA**
5. **GUINEA DOME**
6. **TROPICAL INDIAN OCEAN**
7. **SUBTROPICAL SOUTH PACIFIC GYRE**
8. **WEST KERGUELEN PLATEAU**
9. **EAST KERGUELEN PLATEAU**



In polar regions, the growth period of phytoplankton is closely linked to the seasonal dynamics of sea ice (evolution of its cover and thickness). The bloom occurs at the start of summer when the ice begins to diminish, the mixed layer* is not as deep, and light becomes adequate. Here, the phytoplankton bloom is characterised by "large" phytoplankton: diatoms.

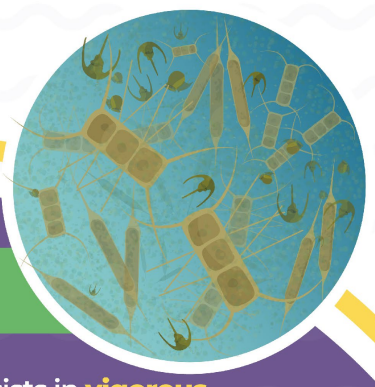


In temperate and sub-polar regions, the phytoplankton dynamic is heavily reliant on seasons and the evolution of the mixed layer*. Winter is a period of weak growth as phytoplankton, mixed into a deep layer, lacks light. The bloom arrives in spring when the mixed layer nears the surface. Here again, the phytoplankton bloom is dominated by diatoms.



At low latitudes, the depth of the mixed layer* and the light available vary little from season to season. Nutrient supply is also constant, **thus allowing stable, continuous phytoplankton growth**, largely dominated by small specimens, all year round.

discover more



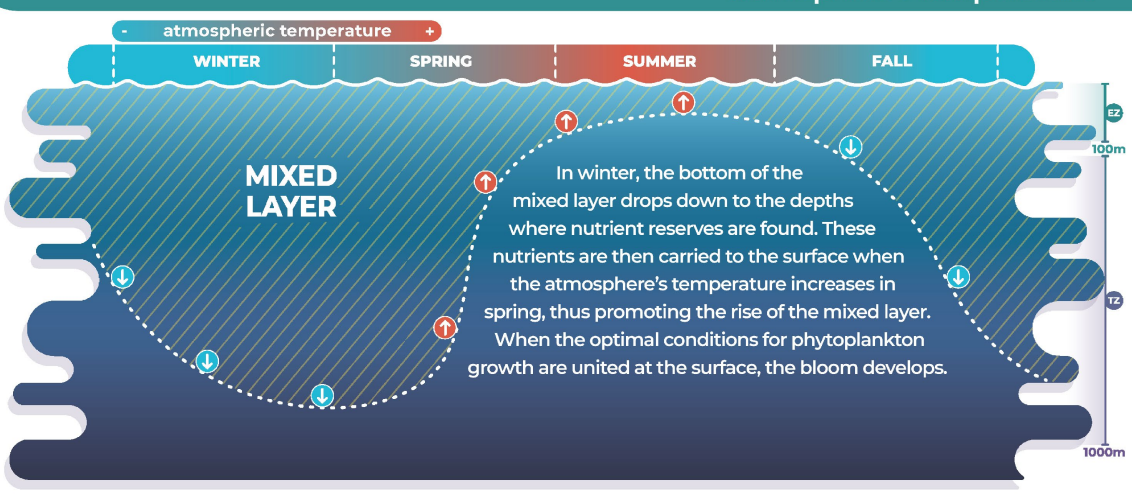
THE PHYTOPLANKTON BLOOM

This phenomenon consists in **vigorous phytoplankton proliferation** in aquatic environments. It results from a favourable combination of different environmental factors. Ideal temperature and lighting conditions, coupled with rich nutrient supply, will set off a phytoplankton bloom.

These explosions of life are so intense that they are visible from space.

Phytoplankton is at the base of the food chain, so a bloom can have a beneficial effect on the whole of the ecosystem. **The bloom is a key phenomenon powering the biological carbon pump.**

***The mixed layer** is the part of the Ocean's surface where water is homogenous in density (combination of temperature and salinity). Its thickness varies from several metres to several hundred metres, depending on wind strength and the atmosphere's temperature.



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