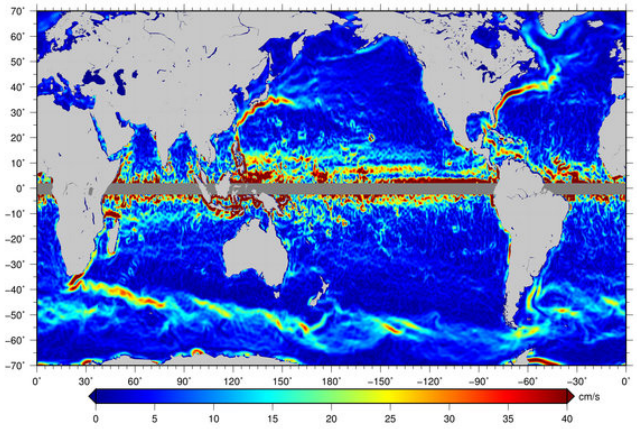
Monitor ocean level and surface

Applications

Operational oceanography

The importance of our understanding of ocean surface phenomena and ocean level has been clear for long. Applications of this knowledge are diverse: oceanographers and climate change experts need them to understand the functioning of oceans, the role they play in the Earth system and how they affect its climate, but there are also a lot of foperational uses of these data.
As made clear by P.-Y. Le Traon (1), operational oceanography is strongly dependent on satellite oceanography: "the ability to observe the global ocean in near real time, at high space and time resolution is indeed a prerequisite to the development of global operational oceanography and its applications".

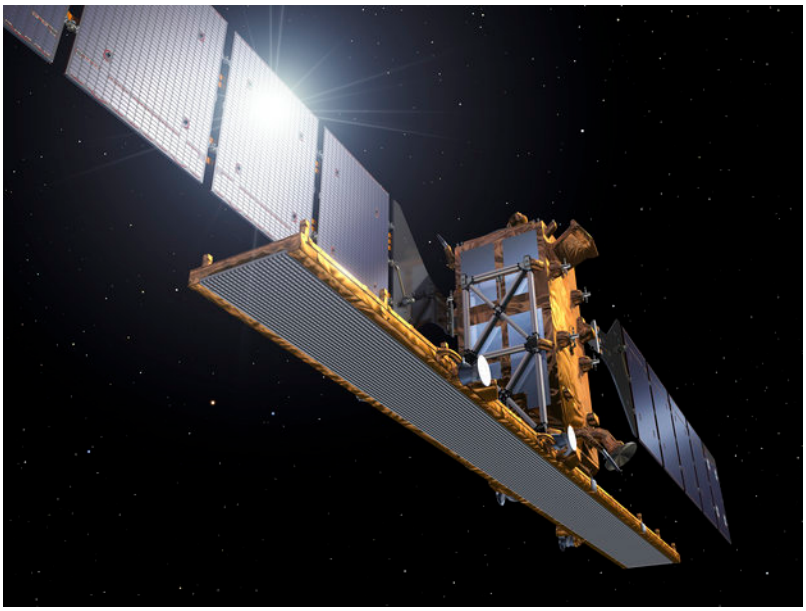


Surface ocean current map. © R. Bingham

Natural parameters to be monitored by satellites and which are either directly used in operations or serve as input in oceanographic models are ocean level surface, ocean circulation, sea surface temperature and salinity, ocean colour, sea ice, waves and winds. Sea level observations are the key inputs since those values are important to understand ocean circulation and ocean interior; surface temperature relates instead to sea-air interaction processes.

Parameters sometime overlap with those needed for climate applications, but operational oceanography has more stringent requirements on high resolution measurements (1).

Examples of direct applications are sea ice monitoring, oil pollution detection, water quality and ecosystems assessment, fisheries and coastal management, but all these data also feed model to monitor and forecast ocean systems. Marine search and rescue and emergency response, ship routing and offshore renewable energy monitoring are other application domains (2).



Artist's impression of Sentinel-1A. © ESA - P. Carril, 2014.

Monitored parameters are built on several satellite measurements combined together. Altimeters, metereological satellites, scatterometers and SAR (synthetic aperture radar) satellites measurement are combined to have continuous and consistent time series that are then calibrated and validated through comparisons with in-situ measurements. The increasing timeliness and accuracy of satellite measurement lead to a more and more systematic assimilation of these data in oceanographic models.

European ocean measurements are currently provided by ESA's Earth Explorer satellites, CryoSat, GOCE and SMOS (2). Copernicus Sentinel-1A, launched in April 2014, will also contribute to a day and night, all-weather, frequently revised world coverage.

References

(1) P.-Y. Le Traon, Satellites and Operational Oceanography http://archimer.ifremer.fr/doc/00073/18383/15958.pdf

(2) http://www.esa.int/Our_Activities/Observing_the_Earth/Satellites_stay_current_on_ocean_currents

Products

Products	Ext. Source	Descriptions	Product Standards	Ref. Project

Success Stories

References

Topic	Description	Keywords	Reference