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## Global Ocean Representations

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► **To cite this version:**

Sebastian Grevsmühl. Global Ocean Representations. Agathe Euzen; Françoise Gaill; Denis Lacroix; Philippe Cury. The Ocean Revealed, CNRS Editions, pp.176-177, 2017, 978-2-271-11907-0. ⟨hal-01668233⟩

**HAL Id: hal-01668233**

**<https://hal.science/hal-01668233v1>**

Submitted on 19 Dec 2017

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# 17. Global ocean representations

Sebastian Grevsmühl

In images of planet Earth taken from space, it is often the preponderance of water that impresses us, like in the famous ‘blue marble’ photograph taken in 1972 during the last Apollo mission. As an icon of environmentalism of the 1970s, this imaginary conjures a ‘global view’ of our Earth. However, one should bear in mind that no ‘global’ view can show the whole Earth, only half of it. Of course, cartography was able to solve the problem early on, but the usual maps of the world introduced another bias: they favored the emerged parts of the planet. Indeed, portraying aquatic dominance presents a singular problem because the great masses of water are all interconnected and form a single ocean. For this reason, recent geography textbooks prefer to refer to a ‘global ocean’, despite the difficulties involved in representing it.

## A Systemic Understanding of the Earth

The first representations of the oceans as a single unit appeared in the 18<sup>th</sup> century. In 1760, the engineer Nicolas-Antoine Boulanger commissioned the engraving of a ‘new map’ which was very innovative, because it used a projection that was quite unusual for the time. It divided the world into a ‘terrestrial hemisphere’ and a ‘maritime hemisphere’ (Fig. 1), on one side, bringing together all the known emerged lands of the time, and on the other, showing the vast extent of our water masses. According to Boulanger, this astonishing distribution could not be a matter of chance, and must be at the origin of a physical law

(unknown at the time) of an all-encompassing terrestrial Theory.

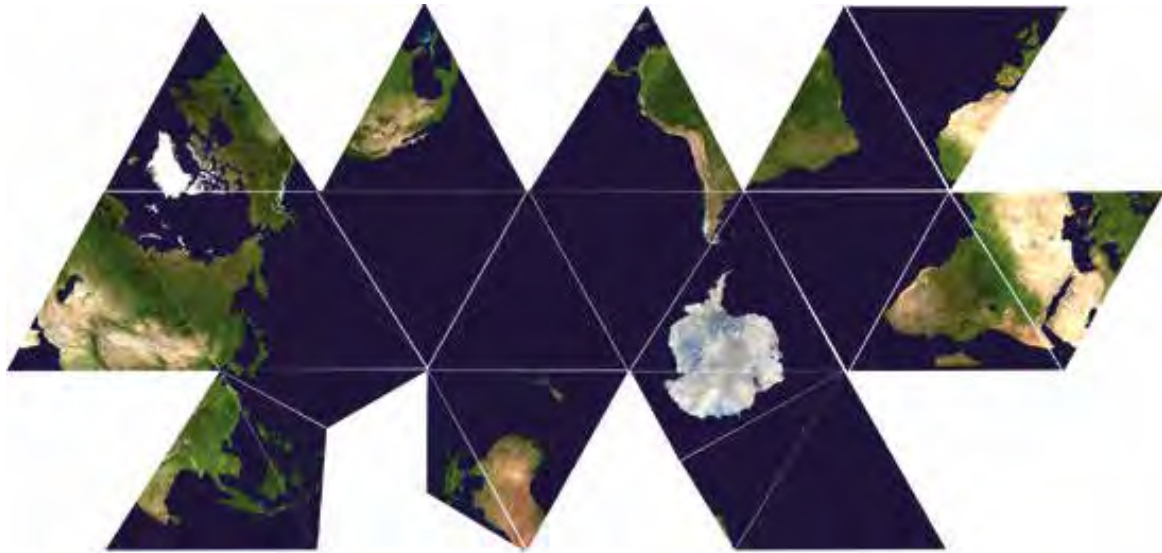
Global geophysical observations – that greatly increased in number throughout the 19<sup>th</sup> century with the institutionalization of Earth Sciences – thereafter promoted an interconnected and global picture of the vast aquatic areas. In the early 19<sup>th</sup> century, with the work of Alexander von Humboldt, maps and graphs begin to circulate, describing the ocean on a global scale, and integrating a holistic view of the environment. Our present representations rely directly on this tradition of providing logical descriptions of the laws of nature. For example, in recent geography textbooks, the image of the global ocean appears as a visual construction, where land masses are represented in the form of patterns and figures that emphasize mutual dependencies (represented by arrows and feedback loops), often including a strong historical dimension capturing the long history of environmental interactions between the ocean, the continents and the atmosphere.



Fig. 1 – New world map by Nicolas-Antoine Boulanger (1760). ■

## Overcoming the terrestrial ‘bias’

Throughout the 19<sup>th</sup> century, very few attempts were made to reach beyond the logic focusing on



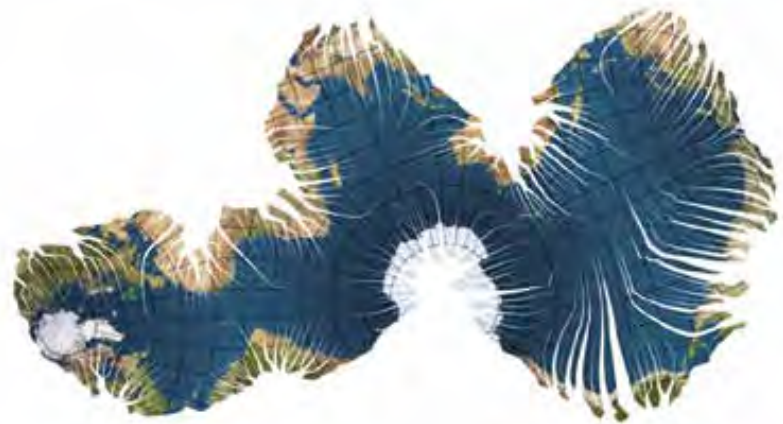
**Fig. 2 – Variation of the Dymaxion map by Buckminster Fuller (1943) showing the global ocean. ■**

the emerged parts of the globe, promoted by the vast majority of cartographic projections, such as the Mercator projection, which remains largely dominant. However, major mapping innovations emerged in the 20<sup>th</sup> century, allowing for new perspectives of the global ocean. For instance, the Fuller projection (projection of the Earth on an icosahedron surface) was published in 1943 in *Life* magazine, a huge success with the general public. The ‘Dymaxion Air-Ocean-World’ map, composed of 20 individual triangles that could be cut out of the magazine by the reader, was the fruit of the imagination of American architect Buckminster Fuller. Having no up or down, and no North nor South, the map can be arranged according to the needs and interests of each user. Thus, it was possible to arrange the individual pieces in such a way as to emphasize the global ocean (Fig. 2). Antarctica appears in the middle of an ocean, itself surrounded by the other continents.

In the same spirit, in 2008, Jack van Wijk proposed another type of projection dubbed ‘myriahedral’ projection (a polyhedron with a very large

number of faces). One of its remarkable applications consists in relegating the continents to the periphery of the map, melting them into a quasi-continuous coastline that surrounds the global ocean (Fig. 3). Finally, more recently, Olivier Serret imagined an elliptical planisphere that retains the surfaces and which is conceived as a model still to be developed. Since the

global ocean is represented as a single unit, his planisphere has the advantage of being able to visualize global ocean processes (such as the thermohaline circulation) continuously. Geographers thus still have the will to overcome territorial conventions in favor of a global vision of the ocean, which today, remains an exciting field of research.



**Fig. 3 – The coastline of the Earth proposed by Jack van Wijk in 2008 with a minimum of distortion. © J. VAN WIJK. ■**

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