Diving into an Acidifying Ocean & Medusae

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Abstract

Part of 'Heartbeat of the Earth' by Google Arts & Culture, these two projects are climate data experiments. 'Diving into an Acidifying Ocean' focuses on the effects of ocean acidification on the marine animals, from the industrial revolution to 2100. 'Medusae', focuses on the Mediterranean seas and looks at jellyfish blooms as a symbol of the stresses of the seas: rising temperatures, acidifying waters, lack of oxygen, invasive species and decrease in natural predators. Both projects are interactive websites that live on the Google Arts & Culture's experiment page, reaching people across the whole world and having had great success in informing the public about the current climate situation.

Keywords: Interactive website, ocean acidification, jellyfish, rising temperatures, hypoxia, invasive species, overfishing.

1. Diving into an acidifying ocean

From the year 1860 to 2100 users can move through time to encounter different animals - from primary producers to top predators - and discover how they are affected by ocean acidification. As time goes by, the user starts encountering anthropocentric "animals" - aka rubbish - that replace marine life.
Upon interacting with an animal, users discover the science via an info card explaining what will happen to the animal in pH conditions expected by 2100. Together with discovering the scientific facts, users are also presented with suggested action items that could help reducing individual carbon footprint.
The dissolution animation that dissolves animals in the project is inspired by a scientific paper about Pteropod showcasing how pteropod's shells placed in water with pH levels expected in 2100 almost completely dissolved over 45 days.
The change of pH of the ocean water is visualised through the colour of the ocean, turning red over time. Together with pH, also data of temperature increase, co2 intake and oxygen loss are presented to the user. All the data presented in this project has been validated by Frederic Gazeau (Laboratoire d'Océanographie de Villefranche).
The visualisation of the animals in the form of a point cloud has been chosen to highlight the ephemeral and fragile marine life, yet creating a deep sense of beauty to connect further with the topic. The audio part of the experience was designed to create a sense of urgency and drama about the topic to make a strong impression with the users.
The UX (user experience) of the project went through many testing faces to create the most accessible yet thorough immersive experience.

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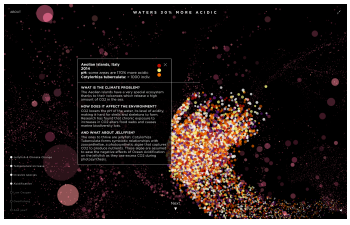
2. Medusae

Medusae focuses on the Mediterranean seas and looks at jellyfish blooms as a data visualisation method Nature has adopted to alert us about the problems the Mediterranean seas are facing.
This project shows a link between the increase of jellyfish blooms and the effects of climate change. Warming of temperatures, oxygen depletion and ocean acidification, coupled with overfishing and invasive species, are giving jellyfish advantage over other marine life.
The web experience has been divided into 5 climate and anthropocentric related chapters that take users across different Mediterranean areas: temperature increase, invasive species, ocean acidification, hypoxia and overfishing. By learning more about jellyfish species, users also learn more about the climate problem and how it affects the environment. This quirky and unexpected point of view, immerse users in the complex topic of climate change.



The colourful point cloud look has been chosen the to create a playful, yet ephemeral environment that captivates users.
For the sound we used data signification mixed with sound design and field recordings taken in different locations across the mediterranean.
All data has been verified by Fabien Lombard (Laboratoire d'Océanographie de Villefranche) and the UX has gone through many testing iterations together with Google's team.

References

1. Resources for Diving into an Acidifying Ocean:
   - Ocean Acidification: Surface pH by NOAA
   - Ocean-Atmosphere CO2 exchange by NOAA
   - WMO Provisional Statement on the State of the Global Climate in 2019 by World Meteorological Organization
   - All the resources concerning the marine life used in this project can be found here.
2. Resources and data for Medusae can be found here