Nick Axel, Nikolaus Hirsch, John Palmesino, Markus Reymann, Ann-Sofi Rönnskog, and Daniela Zyman

Editorial

***Oceans in Transformation* is a collaboration between TBA21–Academy and e-flux Architecture within the context of the eponymous exhibition at Ocean Space in Venice by Territorial Agency and its manifestation on Ocean Archive, featuring contributions by Nabil Ahmed, Charmaine Chua, Jeremy Jackson, Laleh Khalili, Anne McClintock, Margarida Mendes and João Martins, Astrida Neimanis, Peter Sipeli, Territorial Agency, and Mark Williams and Jan Zalasiewicz.**

Venice's cyclical flooding, *acqua alta*, reached the ruinous height of 1.87 meters in late 2019. Under the gaze of Venetians and the incessant flux of tourists, the high waters inundated the old city on several occasions for days. "With the models we have," explains one scientist at Italy's Institute of Marine Sciences (CNR-ISMAR) tasked with operating the country's early warning system, "we could not predict these events."[1] How is it that with all the observational capacities and modelling abilities of modern science, it was impossible to predict these exceptional events in the making?

While storm surges are the primary cause of Venetian floods, the simultaneous occurrence of high waters in the Adriatic and the intensity of the seasonal Scirocco winds pushed the elevated seawater towards the historic city. Combined with "the unfortunate timing" of a local cyclonic vortex rotating and moving rapidly, the full moon, and Venice's location at the upper end of an elongated, semi-enclosed basin, these catastrophic convergences fall outside the scope of past measurement and probabilistic anticipation.

CNR-ISMAR scientists invoked "fortune" to denote the capriciousness of these meteorological conditions.[2] They also called Venice "the canary in the coal mine."[3] Indeed, Venice is all but unique in the type of environmental challenges it is facing. Rising sea levels are one of the most pressing challenges facing the large ocean states of Oceania, especially frontline communities dwelling on low lying islands and atolls. Rising sea levels and erosion have caused islands in the South Pacific to completely disappear. Along the coasts of the eastern United States and Gulf of Mexico, the Ganges-Brahmaputra delta, and the North Sea, massively populated areas are beginning to ramp up (mostly inadequate) protections against the impact of oceano-meteo-geological constellations brewing along the horizon.

Earlier in 2019, the Intergovernmental Panel on Climate Change (IPCC) released the Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), for which hundreds of scientists worked together to quantify the imprint of climate change on the world's hydro-

Territorial Agency, *When above...*, 2020. A light installation on the façade of Ocean Space, Church of San Lorenzo, marks future sea level locked in by global warming – +6m in the next century – and calls attention to the vulnerability of the oceans and the human communities dependent on its wellbeing. Commissioned by TBA21–Academy. Photo: Marco Cappelletti.

and cryosphere and correct assessments issued only five years earlier.[4] According to the report, the mass lost from the Antarctic ice sheet tripled in the last ten-year observation cycle (2007–2016), while that of Greenland doubled (compared to 1997–2006). And yet, SROCC cannot fully account for the melting of our polar ice caps. "We simply don't have the data."

A portion of Antartica's huge ice reservoir sits on land that is below sea level, and is restrained from flowing into the ocean by large ice shelves. The warming ocean has already begun to attack the deep roots of these ice shelf bases, eroding them from below and causing huge portions of ice sheets to collapse into the ocean. But no one has ever been to the deep bases of the Antarctic ice shelf, and glaciologists rely on only a few "poor images" collected by remotely operated underwater vehicles to evaluate the speed and magnitude of their deterioration.

In terms of planetary stewardship, the oceans and the cryosphere carry the load in the functioning of the earth system. They modulate climate variability, and store more carbon than the land and atmosphere combined. And yet, our knowledge and attention accorded to them is patchy, incoherent, and conceptually warped. Their predictive models rely on physics, hydrology, science, and the "vast machine" of past records and observations. As conditions are rapidly changing, these models wrestle with the incalculability and unknowability of future extremes.

Human impact on the Earth is usually narrated as a story of terrestrial and atmospheric modification, with a focus on stratigraphic markers. Yet what is ultimately at stake in the Anthropocene is the health of our aqueous planet. While sea level rise has become the most alarming and acknowledged harbinger for oceanic catastrophe, a host of invisible and slow processes forcing marine degradation are undertheorized and often experienced and spoken for by different actors and research disciplines.

New technologies of vision and remote sensing systems are currently affording a capillary measuring of the ocean in unprecedented ways. Never before have researchers been able to collect data in such abundance. A dense web of geospatial intelligence, comprised of remote sensing devices, satellite imaging, and real time tracking technology create new media geographies of the earth surface. This same arsenal of reconnaissance used to know the oceans is also being deployed to increase extraction and surveil maritime activities.

Terrestrial bias will only continue at increasingly high cost to our civilizations. How, then, can we sharpen the conceptual repertoires that would allow us to better "know the oceans"? As an alternative to the partialized inquiries of "geo"-science, we could begin by reading the findings of earth system science along with world system analysis using the languages of philosophy, the humanities, indigenous thinking, architecture, and the arts. By connecting land to water, we might be able to instigate new forms of collective action that are capable of reinventing the future of the world's ocean, and ours.

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Institute of Marine Sciences (ISMAR) of the Italian National Research Council (CNR) collaborates with the Tide Forecasting and Reporting Center of the Municipality of Venice (Centro Previsioni e Segnalazioni Maree del Comune di Venezia) and the institutes ISPRA and ARPA of Emilia Romagna for developing sea level and wave forecasting models. “On this specific occasion, the rapid transit of a very local phenomenon, such as the cyclonic vortex L2, was difficult to predict,” reads the official report of ISMAR’s homepage. Christian Ferrarin, Jacopo Chiggiato, Marco Bajo, Katrin Schroeder, Luca Zaggia, and Alvise Benetazzo “VENICE: The exceptional high sea level event of 12/11/2019. Preliminary analysis of the data and description of the phenomenon,” November 28, 2019, □, 5.

2
Ibid., 3.

3
Institute of Marine Sciences, CNR-ISMAR, Venice, Italy et al., “The 2019 Flooding of Venice and Its Implications for Future Predictions,” *Oceanography* 33, no. 1 (March 1, 2020): 42.

4
IPCC, “The Ocean and Cryosphere in a Changing Climate,” 2019, □; IPCC, "Climate Change 2014: Synthesis Report," 2014, □.