06

Patterns of Interconnectedness: Venice Is Not Alone in the Anthropocene

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Notes

This essay explores the interconnectedness of environmental phenomena in the Anthropocene through the lens of Venice's waterscape. It argues that climate change, biodiversity loss, and extreme weather events transcend national borders and must be approached systemically, combining natural sciences and the humanities. Using Venice and St. Petersburg as symbolic case studies, the text highlights how historically cosmopolitan water cities face parallel challenges—rising seas, infrastructural limits, and governance failures—that reveal broader global patterns. Drawing on planetary thinkers like Vernadsky and Chizhevsky, the essay calls for scalable, interdisciplinary approaches to environmental governance that connect the local with the global.

On 12 November 2019, Venice was hit by a flood that resulted in a tidal rise of 187 cm, one of the most dramatic water rises in the city's recent history. In 2020, COVID-19, which broke out in 2019, was declared a global pandemic with devastating effects not only on human health and mortality, but also on every aspect of human well-being, psychologically, socially, politically and economically. COVID-19 was strongly linked to other phenomena: to mention just two, global warming and deforestation have acted as indirect drivers of the global spread of the virus, as habitat loss forces animals to migrate, potentially coming into contact with other animals or humans, creating opportunities for pathogens to enter new hosts.

In May 2022, the Mediterranean experienced the longest heatwave on record for 40 years, with sea temperatures rising by up to 4°C and peaking at over 23°C. This has already been associated with extreme phenomena such as torrential rain, floods, and storms in much of Europe. At the same time, other parts of the Earth, such as Pakistan, also experienced extreme events, leading – among other things – to severe crop failures. The environmental crisis took on devastating proportions in those areas, affecting the production and export of wheat, and thus the country's economy and poverty levels. As if that were not enough, these phenomena are linked to social rebellions and conflicts that, contrary to what many governments still think, are becoming a matter of global security. In Venice, as in those faraway places, the hazardous events that resulted in socio-ecological disasters were caused by a complex combination of factors. The large atmospheric low pressure over the Mediterranean and the associated sirocco wind blowing over the Adriatic were partly responsible for the high water levels in Venice. Sea level rise is clearly due to rising global temperatures, which cause glaciers to melt, so this chain of events and processes ultimately played a role in lifting the water out of the lagoon. But there is another factor to consider: the astronomical environment, because the biosphere and the hydrosphere are not separated from their outermost environment, cosmic space. The winds, and in particular the sirocco that blew across the Mediterranean, coincided with one of the tidal peaks of the full moon (The ISMAR Team 2020).

What I am trying to imply with these examples of the human-environment nexus is that environmental phenomena today cannot be understood only as arising from local conditions because they are often the result of the activity of interconnected processes that have occurred at different levels. This means that only a systemic perspective can capture what's common to these interrelated processes. Climate change, biodiversity loss, melting glaciers, heat waves and other extreme events can produce effects that transcend national borders contributing to cascading accidents in remote areas, with consequences that reach far beyond local geographies. Local changes are at the same time bringing about an overall change in the Earth's

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functioning that does not only affect one or the other ecosystem – the biosphere or the cryosphere – but is deeply systemic and complex, and as such must be approached and investigated with equally systemic methods, resulting from the dialogue and integration of different disciplines, where the sciences can interface with the humanities.

Earth upheavals must also be understood as the result of a cultural, social, political, and economic history that has characterized and shaped our societies. The reverse is also true: geophysical factors are historically correlated with biological and social phenomena. In the first half of the twentieth century, this correlation was a preoccupation of the Russian physician, biophysicist, and heliobiologist Alexander Chizhevsky, who explained in his book *Physical Factors of Historical Processes* (1924) that geophysical processes have an influence on human history.

He argued that there are correlations between periods of increased solar activity, such as sunspot cycles, and increased levels of unrest, revolutions, wars, and epidemics throughout history. By compiling statistics on 'biospheric' processes and their relationship to solar cycles, he came to see geophysical factors as intimately linked to human factors and invited not only historians but also scientists to rethink their methods of studying the thermodynamic basis of the biosphere. He based his assumptions and analysis on the idea of co-evolution between the different spheres of the Earth, rather than a co-determining relationship in which nature determines the fate of humanity in a monocausal way. Chizhevsky adopted a systemic approach that was deeply rooted in the rich and long-standing Russian and Eastern European tradition in biogeochemistry and Earth sciences, an approach that would be taken up, for example, in the more mature developments in global ecology and biosphere studies in the second half of the twentieth century, when the notion of the global environment emerged as an object of both science and global politics.

Indeed, drawing on the work of naturalists, philosophers, and geologists such as Vladimir Vernadsky, George Perkins Marsh, and Antonio Stoppani, who investigated the role of humans as agents of planetary change in the late nineteenth and early twentieth centuries, scientists and humanists in the last two decades – encouraged by the debate launched by Paul Crutzen and Eugene Stoermer in 2000 – have addressed the 'Anthropocene' as a concept that helps to overcome the dualism that in the past separated nature and culture, the environment and society, the anthroposphere and the geospheres. Indeed, Anthropocene scholars like Jan Zalasiewicz, Will Steffen (who recently passed away), and Jürgen Renn have considered elaborating a global systemic approach that proposes a co-evolutionary interpretation of human and cultural formations with biogeochemical processes involving the interaction of different parts of the Earth. Thus, a geohistorical, geocultural, and geoanthropological view of the evolutionary history of organisms – including the powerful geological force of humanity – and the environment is the basic approach to understanding the Anthropocene, its predicaments and the responsibilities it entails (Renn 2020). Although the Anthropocene refers to a notion of a global environment that envelops the Earth, it is not a notion that neglects or homogenizes the diversity of the Earth's territories and local issues.

These issues have also been tackled from the perspective of global environmental policy and governance. Simon Dalby, Professor of Geography and Environmental Studies, has examined the climate and environmental crisis in terms of the transnationality of these phenomena. In his recent book, *Anthropocene Geopolitics*, he argues that climate and environmental problems are transnational phenomena that require a new understanding of borders in the Anthropocene (Dalby 2020). That is, most security and environmental policies continue to be based on outdated notions that look back to a time when geopolitical threats stemmed mainly from the rivalries of states with fixed borders. Instead, the geopolitics of climate change demonstrates that security policy must look forward to rapidly shaping a sustainable world that is no longer dependent on fossil fuels, a turning point that will benefit humanity

globally. As we saw at the beginning of this text, environmental problems affect all of humanity in one way or another. Climatologists such as Ricarda Winkelmann are studying the rapid and irreversible cascades of changes known as 'tipping points' in the climate system, i.e. 'points of no return' or thresholds that, if crossed, will have a domino effect on various socio-environmental systems. Tipping points increase as the Earth's temperature rises, amplifying global warming and its effects in a feedback loop. For example, the melting of glaciers, especially the Arctic sea ice and the Greenland ice caps, not only reduces the albedo effect, but also raises sea levels, contributing to the risk of extreme events such as the flooding and inundation that plague Venice and other water cities around the world.

According to Dalby, new concepts such as 'planetary boundaries' should act as a trigger to redefine, for example, the geopolitical interpretation of the Anthropocene problem. Global politics is not yet concerned with the patterns of interconnectedness of these phenomena. Global politics is still interested in protecting borders and national sovereignty. In a sense, sovereign states still have the choice of whether or not to adhere to environmental protocols, treaties that limit the use of certain substances, or international agreements that regulate carbon emissions. Dalby claims that the displacement of environmental phenomena has made it clear that classical geopolitical thinking, which once suggested that climates in different parts of the world determined the fate of human communities, is now backwards; geopolitics now shapes future climates, not the other way around.

In the early twentieth century, geochemist and mineralogist Vladmir Vernadsky used the concept of *living matter* to explain that the biosphere has no defined geographical boundaries. Its extent is defined by the scale of observation; hence there is nothing large or small in nature. The ubiquitous role of the biosphere in shaping the Earth is based on its ability to perform a global biogeochemical function involving the transformation of every element that touches the soil, evaporates into the air, and falls into the ocean.

Venice, the City of Canals, has long captured the global imagination with its magnificent architecture, rich history, and unique way of life. However, beneath its picturesque façade lies a city struggling with systemic issues that intertwine its past with the current environmental crisis. With all the environmental problems that Venice must deal with, often unsuccessfully, the lagoon city is a good example of the transversality of certain phenomena. Since its urban and architectural development, Venice has been a crossroads of economic and cultural exchange. Founded over 1,500 years ago on a network of marshy islands in the Venetian lagoon, the city grew into a maritime power that dominated trade routes and shaped European commerce for centuries. Its wealth and influence were built on a mastery of water, with the Venetians building an intricate system of canals, bridges and palaces that won the admiration of the world. Venetian-born architects such as Giacomo Quarenghi left Italy for St. Petersburg, where their talent and experience helped to create some of the most iconic buildings and monuments of Tsarist Russia. Venice has always been a deeply cosmopolitan city, a bridge between East and West, as Amitav Gosh argues.[1] But it is this relationship with water, which once defined Venice's prosperity, that now threatens its very existence. The systemic aspects that link Venice's past to its current environmental crisis are many. Centuries of human intervention, from land reclamation to the construction of palaces, have altered the delicate balance of the lagoon's ecosystem. Meanwhile, modern infrastructure projects, such as the MOSE (Modulo Sperimentale Elettromeccanico), a flood barrier system designed to protect the city, have been at the centre of heated debates and scandals. Cost overruns and allegations of corruption have highlighted issues of governance and accountability. Most importantly however, scientists have analysed the impact of

1 https://milanodabere.it/senza-categoria/amitav-ghosh-venezia-porta-tra-oriente-e-occidente/.

the MOSE barriers on the morphological evolution of the lagoon, showing that the repeated and prolonged use of the gates threatens the future of the salt marshes (*barene*), which are crucial for maintaining the integrity of the ecosystem and providing so-called 'ecological services'. Last but not least, Venice's *hypertourism*, as Robert Davis called it, has fuelled its economy but also contributed to environmental degradation. The influx of visitors generates waste and disrupts fragile ecosystems, exacerbating the city's ecological footprint (Davis 2022). As the city grapples with the consequences of its past and present actions, it stands as a microcosm of the broader challenges facing coastal communities worldwide in an era of climate change and in a new epoch of anthropogenic significance. Indeed, Venice's environmental problems are similar to those of other cities around the world, such as Amsterdam, Hamburg, Los Angeles, and St. Petersburg, known as the 'Venice of the North' for its network of canals and bridges, which is now facing its own environmental predicament. The Russian ethnologist and anthropologist Lev Gumilëv argued that civilizations are not isolated entities, but are linked by trade, migration, and conquest. Cultural exchange between different peoples facilitates the spread of ideas, technologies, and social practices, leading to the enrichment and transformation of cultures over time. It is not surprising, then, that Venice is not alone, for better or for worse. Unfortunately, the similarities between the two cities also concern the most emblematic aspects of the global environmental crisis, serving as iconic examples of the Great Acceleration of the Anthropocene. Like Venice, St. Petersburg is threatened by flooding and erosion. Both cities rely heavily on tourism, which contributes to their economic vitality but also strains their ecosystems and infrastructure. In addition, both cities face similar problems in terms of the technological solutions that should be used to regulate water levels. One of the most important projects to protect St. Petersburg from flooding is the St. Petersburg Flood Protection Complex, commonly known as the St. Petersburg Dam. Although it provides essential protection against flooding, it is not without controversy. Critics have raised concerns about the dam's environmental impact, particularly its potential to disrupt the natural flow of water and sediment in the Neva River delta. In addition, there have been debates about the effectiveness of the dam in the face of increasingly severe weather events and rising sea levels associated with the worsening global climate change and environmental degradation. Similar criticisms have been levelled at the MOSE, so it seems that not only are the causes of certain environmental and atmospheric phenomena similar in different parts of the world, but so are the engineering strategies that have been put in place to mitigate these phenomena. Efforts to limit sea level rise, preserve cultural heritage, and promote sustainable tourism do not appear to be coordinated and concerted at the local, national, and international levels. At the same time, it does not seem as though innovative engineering solutions have been coupled with effective environmental governance that takes seriously the engagement of local communities, the history of water cities, the interdisciplinary collaboration between the sciences and the humanities, and the perspectives of conservationists, environmentalists, and archaeologists. In this sense, an aggregated expertise that shapes an idea of the environment as a global and interconnected complex should probably override short-sighted solutions that tend to focus on addressing immediate, localized issues without considering broader systemic or long-term implications. Today, much emphasis is placed on local contexts, identities, and the protection of specific sites, but this commitment makes little sense if we miss the global picture and do not consider the reciprocal evolutionary relationships between the local and the global that have forged these identities. Scalability is the key to understanding the environment in the Anthropocene, where the microscopic is linked to the macro, and the regional to the Earth.

With this short essay, I have tried to emphasize the importance of a comprehensive, systemic view of environmental phenomena, which is also inspired by the approach and legacy of Russian systemic and planetary studies. Moreover, I have

used the symbolic comparison of Venice and St. Petersburg to highlight the global evolution of a cultural phenomenon that is unfortunately revealing its dark side today in the context of such a global environmental crisis brought about in and by the Anthropocene.

Mandatory Reading

Rispoli, G. (2022). "Planetary Environing: The Biosphere and the Earth System". Wickberg, A.; Gärdebo, J. (eds), *Environing Media*. London: Routledge, 54-74.

Further Optional Reading

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Chizhevsky, A.L. (1924). *Physical Factors of the Historical Process*. Kaluga: Pervaya Tipographiya.
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