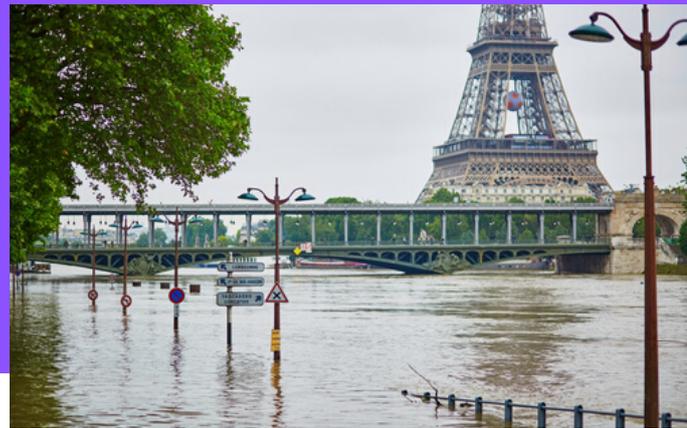


IMPACT REPORT

The ticking time bomb of climate change and sea-level rise: Why human actions in the next 10 years can profoundly influence the next 10,000
Science Commentary N° 2 - February 2017



Credit: Shutterstock

Based on the seminal Nature Climate Change publication by Clark *et al.* (2016)*, EMB published its second Science Commentary in March 2017, entitled 'The ticking Time Bomb of Climate Change and Sea Level Rise: Why human actions in the next 10 years can profoundly influence the next 10,000'.

The first draft was already promoted by EMB member Marine Universities of France, at the UNFCCC COP22 in Marrakech in November 2016. The Science Commentary was officially launched on the occasion of the "China-EU Blue Year" meeting in Bruges and copies were shared with a delegation of officials from the State Oceanic Administration of China and the Chinese Representation to the EU. Hard copies were widely disseminated, including at the European Climate Research Alliance (ECRA) General Assembly and at the IOC-UNESCO 2nd International Conference on Marine/Maritime Spatial Planning, both in March 2017. Online dissemination included several networks and organisations' Tweets and newsletters, such as the European Polar Board and the IUCN Global Marine and Polar Program.

The main impact of this publications was the promotion of the central message that the climate change effects in global mean sea-level rise beyond 2100 shouldn't be disregarded and that the decisions we make in the next 10 years could profoundly affect the next 10,000. This is included in the IPCC Special Reports on Global Warming of 1.5 °C and on The Ocean and Cryosphere in a Changing Climate. The Dutch magazine NRC published an article based on the publication, promoting this message as well.



Credit: National Geographic

DISSEMINATION IN NUMBERS

These statistics are for EMB Science
Commentary N° 2

Data collected for a period of 2 years from
launch (February 2017 to September 2019)

15 **TWEETS**
From the EMB Twitter account
and other accounts

2 **NEWS RELEASES**
By EMB highlighting the
Science Commentary

3 **ARTICLES**
Based on the Science
Commentary on websites and a
magazine

789 **HARD COPIES**
Of the Science Commentary
disseminated

35 **DOWNLOADS**
From the EMB website (from
September 2018)

131 **PAGE VIEWS**
On the relevant page on the
EMB website

The ticking time bomb of climate change and sea-level rise:

Why human actions in the next 10 years can profoundly influence the next 10,000

In December 2015, political leaders from 195 countries attending the United Nations Climate Change Conference (COP21) in Paris, agreed to take action to address the causes and consequences of global climate change. Specifically, they committed to keeping the rise in average global air temperature by the end of this century to “well below 2°C above pre-industrial levels” (i.e. before 1750 and the advent of the industrial revolution).

The 350-year window between 1750 and 2100 may seem like a long time in the context of human lifespans. However, in a seminal paper published in *Nature Climate Change*, Clark et al. (2016) have questioned the overemphasis in the global climate discussion on climate change as a 21st century only phenomenon, and on near-term impacts up to 2100. They argue that any increases in carbon dioxide (CO₂) from human activity will remain in the atmosphere and continue to affect Earth’s climate for tens to hundreds of thousands of years.

Notwithstanding changes in air temperature, there is a time lag between rising CO₂ levels and the changes in sea levels that inevitably follow (see also DeConto and Pollard, 2016). To understand this, we need to look back, not 250 years, but at least 20,000 years. To properly consider the consequences, we need to look forward, not just to the end of this century, but to impacts of today’s actions that will play out over millennia.

Over the next 10,000 years, the global mean sea-level rise that will inevitably result from even a modest emissions scenario will reach



25 m, causing inundation of many of the world’s most densely populated coastal cities and regions, directly affecting 1.3 billion people or 10% of the global population (based on 2010 population figures). A higher, business-as-usual scenario will result in a global mean sea-level rise of 52 m, with even more devastating effects.

With this much longer timeframe in mind, Clark et al. stated that the real consequences of unchecked CO₂ emissions will be “large-scale and potentially catastrophic climate change.” The authors also emphasize the magnitude and urgency of the response that is needed. We are presented with a narrow window of opportunity to avoid the worst of these impacts for future generations. The only effective decarbonization is to move as rapidly as possible towards the complete decarbonization of the world’s energy systems by targeting net zero or negative carbon emissions.



Map demonstrating what the continental coastlines in different regions of the world (left to right, Europe, South America, Southern Asia, Australia and Africa) would look like if all the ice on land melted and drained into the sea, raising the sea level by 65.8 meters. (credit: National Geographic)

* Peter U. Clark, Jeremy D. Shakun, Shaun A. Marcott, Alan C. Mix, Michael Eby, Scott Kulp, Anders Levermann, Glenn A. Milne, Patrik L. Pfister, Benjamin D. Santer, Daniel P. Schrag, Susan Solomon, Thomas F. Stocker, Benjamin H. Strauss, Andrew J. Weaver, Ricarda Winkelmann, David Archer, Edouard Bard, Aaron Goldner, Kurt Lambeck, Raymond T. Pierrehumbert and Gian-Kasper Plattner (2016). Consequences of twenty-first century policy for multi-millennial climate and sea-level change. *Perspective article in Nature Climate Change* 6: 360-369. DOI:10.1038/nclimate2923.