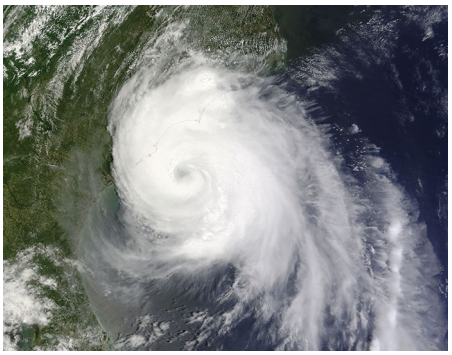
ATMOSPHERIC SCIENCE

Cyclones slow down

Nature **558**, 104–107 (2018).



Credit: NASA

Tropical cyclones have the potential to cause significant socio-economic damage. With anthropogenic warming, it is generally expected that their translation speed — that is, the speed at which they move — will slow down. As evidenced by Hurricane Harvey in 2017, such sluggish movement substantially increases the risk of loss of life and destruction. Using global observations of tropical cyclone 'best track' data, James Kossin from NOAA's National Centers for Environmental Information, USA, examines how tropical cyclone translation speeds have changed since 1949.

Cyclone speeds are found to have decreased globally by ~10%, plausibly related to a weakening of the background tropical atmospheric circulation. For landfalling systems, however, which have societally relevant impacts, changes have been more pronounced: storms in the western North Pacific, North Atlantic and Australian regions have slowed by 30%, 20% and 19%, respectively, increasing local rainfall totals and corresponding storm-induced damages. Further analysis is required to determine the sensitivity of cyclone speed to anthropogenic warming, but when factoring in a projected poleward extension of cyclone tracks, increased adaptation efforts seem necessary to minimize destruction. *GS*

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BIOGEOCHEMISTRY

Mapping photosynthesis

Glob. Change Biol. https://doi.org/cq2p (2018).

Measurement of light released during photosynthesis — known as solar-induced fluorescence (SIF) — is a promising way to detect plant photosynthetic activity. Because SIF can be measured from satellites it is an exciting prospect for understanding global-scale patterns of plant productivity, providing a new window on climate–biosphere interactions. Fine-resolution Orbiting Carbon Observatory-2 (OCO-2) measurements now provide an opportunity to examine SIF– gross primary production (GPP) relationships at ecosystem scale using flux towers for comparison.

Xing Li from the University of New Hampshire, Durham, and co-workers conduct a global analysis of the relationship between OCO-2 SIF and flux tower GPP for 64 sites across eight major biomes to investigate how strong the SIF–GPP relationship is for each biome and whether a robust, general relationship can be found.

Credit: NASA

They detect strong linear (daily timescale) relationships between SIF and GPP measurements for all biomes except evergreen broadleaf forests. These findings support the use of fine-resolution SIF observations for the estimation of terrestrial photosynthesis across a wide variety of biomes. They also identify some of the limitations of this approach for ecosystem functioning and carbon cycle applications. *AB*

https://doi.org/10.1038/s41558-018-0221-y

OCEAN ACIDIFICATION

Buffering sensitivity

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Ocean chemistry is changing due to higher levels of CO_2 affecting the carbonate system through alterations in carbonate, bicarbonate and proton concentrations, but also the buffering capacity of seawater. Reduced buffering capacity means further CO_2 uptake could lead to greater variability in ocean acidification with implications for marine biology.

Different biological sensitivities to carbonate system changes have been observed in manipulation experiments and it is unclear what influences the responses. To address this question, Sophie Richier of the University of Southampton, National Oceanography Centre, UK and co-authors analyse 17 shipboard manipulation experiments from three research cruises spanning temperate (European coastal) waters to polar seas (Arctic and Southern Ocean). Results show that biological responses to carbonate system changes vary with latitude and the inherent buffer capacity of the location. Phytoplankton size influenced the response, with larger cells — which have thicker microenvironments surrounding them — expected to have greater natural variability of the carbonate system at the cell surface and therefore a greater tolerance to future changes.

These results highlight the importance of considering regional characteristics as well as cell-size effects when predicting ocean acidification effects on marine primary production. *BW*

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CLIMATE POLICY

Aging policy priorities

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Although countries have begun to adopt mitigation and adaptation policies, it remains uncertain whether there exists sufficient citizen support to enact the policies needed to achieve the Paris Agreement's goals. A particularly difficult hurdle is that support for climate policies requires consideration of long time horizons that may be inconsistent with individual interests.

Mark Andor and colleagues at the RWI-Leibniz Institute for Economic Research and Ruhr-Universität Bochum draw on data from surveys conducted between 2012 and 2015 on over 12,000 German households to examine whether there is an association between age and attitudes towards climate policy that is characterized by short-term costs and long-term benefits. They show that elderly people have less concern for combating climate change and are less likely to support allocating public resources to climate-friendly policies. For other global challenges, they find that concern increases with age.

This research shows that demographic trends can not only influence climate change through aggregate growth and consumption patterns, but also through individual policy preferences. *AY*

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