research highlights

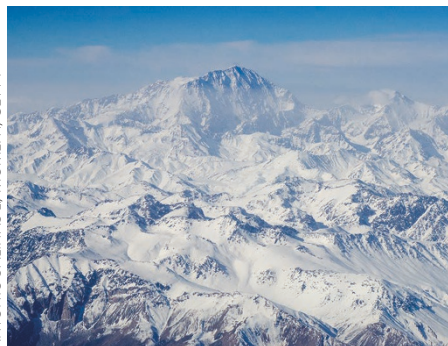## ATMOSPHERIC SCIENCE
Peruvian freezing height
J. Geophys. Res. Atmos. **122,** 5172–5189 (2017)

High mountain glaciers in the tropical Andes have shown rapid retreat in recent decades, affecting water security in downstream regions reliant on glacial melt for consumption, irrigation, and hydropower. Given their tropical latitude, glaciers in this region show strong sensitivity to air temperature, specifically the freezing level height (FLH) — the lowest level in the atmosphere in which temperatures are 0 °C.

Simone Schauwecker from Meteodat GmbH and the University of Zurich, Switzerland, and colleagues, investigate future FLH changes to determine how ice extent may change for Cordillera Blanca and Cordillera Vilcanota, the two largest glacier-covered regions in Peru. They use *in situ*, reanalysis and remote sensing data, alongside future projections from CMIP5 models forced with the RCP2.6 and RCP8.5 emission scenarios.

The authors reveal that FLH can be expected to increase by ~230 m and ~850 m for RCP2.6 and RCP8.5, respectively. Based on contemporary FLH–glacial-extent relationships, even under the most optimistic scenario (RCP2.6), roughly half of the current glaciated area can be expected to disappear by the end of the twenty-first century. For RCP8.5, however, glacier patches may only remain for the highest peaks (>5800m). These results suggest adaptation is required to ensure future water security. *GS*

BIODIVERSITY
Trait economics
Ecol. Lett. http://doi.org/f97pdq (2017)

The mechanisms through which communities respond to climate can be complex, making the forecasting of community responses to climate change challenging. Changes in community traits are commonly interpreted as resulting from environmental selection of optimum trait values. However, if the available number and type of trait combinations are constrained by environmental stress — because the cost of adopting extreme trait values is only affordable when trade-offs are made with other traits — this could constrain species diversity.

Addressing this hypothesis, John M. Dwyer from the University of Queensland, Australia, and Daniel C. Laughlin at the University of Waikato, New Zealand, investigate plant communities growing along a hydrological gradient in Western Australia. They assess how covariance among specific leaf area, maximum height, and seed mass changes with aridity, and how community diversity is related to trait covariance.

Commonly used functional diversity measures were poorly explained by aridity, and were surprisingly weak predictors of community richness. Contrastingly, the covariance between maximum height and seed mass strengthened along the aridity gradient, and was strongly associated with declining richness. These findings demonstrate that declines in species richness under environmental stress can be due to increasing constraints on multidimensional phenotypes. *AB*

CLIMATE GOVERNANCE
Mobile payments for REDD+
Ecol. Econ. **139,** 150–157 (2017)

The Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiative aims to financially reward forest stakeholders who improve their carbon management. One challenge influencing REDD+ effectiveness is the ability to distribute its benefits. Specifically, logistical difficulties — for example, paying participants dispersed over a large landscape — consume time and energy, while organisational costs such as for payment disbursal erode available funds.

Benjamin Thompson, from the National University of Singapore, discusses the importance of 'mobile money' — a payment system whereby money is transferred through cell phones, without the need for a bank account — to help implement REDD+. This approach could simplify the organizational structure, reduce transaction costs, and make the payment system quicker and more transparent. In addition, mobile money could promote female empowerment in social contexts where cultural norms make it more difficult for woman to manage money directly. The growing diffusion of cell phones subscriptions and network coverage in developing nations with relevant REDD+ programs (including China, Cambodia, Tanzania, and the Philippines) makes mobile money an increasingly viable possibility to manage REDD+ payments, boosting the diffusion of forest restoration programs. *MG*

PSYCHOLOGY
Papal credibility and beliefs
Cognition **166,** 1–12 (2017)

Whether audiences perceive a communicator as credible is not based solely on perceived expertise, but also includes judgments of shared cultural beliefs and values. Accordingly, many hoped that the Pope's encyclical advancing the message that addressing climate change is a moral issue would resonate with US conservatives, who share the church's socially conservative values but tend to be more sceptical of climate change than liberals.

Asheley Landrum from Texas Tech University, USA, surveyed Americans before and after the release of the Pope's encyclical. Regression models showed that awareness of the Pope's encyclical increased beliefs about the seriousness of climate change and beliefs that climate change would have a greater effect on the poor, but only indirectly via increased perceptions of papal credibility. Moreover, this effect was moderated by political ideology, such that more conservative individuals were less likely to view the Pope as more credible, and were consequently less likely to show changes in beliefs. These results suggest that prominent figures cannot simply leverage their authority to influence public opinion on heavily politicized issues. *JR*

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