bound by organic matter — dropped proportionately, suggesting that the phytoplankton's enforced diet was due to pH-induced changes in iron chemistry that made the nutrient less available to them, and not because of a physiological reaction to more acidic conditions. In samples of Atlantic surface waters, the team saw the same effect: on average, iron uptake by a marine diatom in these field experiments dropped 10–20% as ocean acidity increased by 0.6 pH units.

By 2100, ocean acidity is projected to increase by 0.3–0.4 pH units under a 'business as usual' emissions pathway. The researchers did not find that acidified waters reduced phytoplankton's intrinsic need for iron, suggesting that iron shortages could well diminish phytoplankton in many ocean areas as acidity increases.

Richard Van Noorden

CLIMATE PREDICTION

Don't count on it

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Geophys. Res. Lett. **36,** L23711 (2009)

Governments and the private sector are seeking to base decision-making in such areas as agriculture, health and water management on seasonal climate forecasts, which predict temperature and precipitation from one to nine months in advance. The problem, according to a new analysis, is that existing climate models show very little accuracy more than one month out. Even during the first month, predictions are markedly less accurate for the second half than the first. Current models simply cannot account for the chaotic nature of climate, researchers say.

David Lavers of Princeton University in New Jersey and colleagues tested eight seasonal climate forecast models — essentially extended weather forecasts — for their skill at predicting temperature worldwide and precipitation over land masses. 'Skill' is the degree to which predictions are more accurate than simply taking the average of all past weather measurements for a comparable period — for example past February temperatures in northern France. Overall, temperature was better-predicted than precipitation, but the longer-range the forecasts, the narrower the areas in which they were skilful. At longer lead times, skill was negligible for land areas.

Decision-makers require significantly improved models to develop meaningful policies, say the authors, adding that this goal may prove elusive.

Harvey Leifert

EXTREME EVENTS

Strengthened storms

NASA

Science **327,** 454–458 (2009)

The number of strong storms in the western Atlantic could double by the end of the century, despite a drop in the overall number of storms, finds new research. Previous studies have hinted at an increase in hurricane intensity, but scientists have now used a modelling approach capable of capturing storms of category-3 or higher intensity, enabling them to simulate twenty-first-century storms realistically.

Morris Bender of the US National Oceanic and Atmospheric Administration and colleagues applied a two-step 'downscaling' technique to increase the resolution of climate models. Using the ensemble-mean of 18 global climate models and 4 regional models, they assessed the climatic response to a 'business as usual' emissions pathway. They then employed a hurricane model to simulate storm development in response to the projected warming. In the simulations, the number of category-4 and category-5 storms in the Atlantic Ocean rose 81 per cent by 2100, while the number of storms with winds greater than 65 metres per second increased by 250 per cent. The largest jump in intense storm activity occurred in the western Atlantic Ocean.

The researchers caution that the increasing numbers of the strongest storms could drastically raise the cost of storm damage.

Alicia Newton