1. Has the amplitude of El Niño events increased in recent years? This report suggests that ENSO events are now starting from a higher level, leading to a stronger El Niño (weaker La Niña) signal in the atmosphere and ocean.


**Abstract:** State-space models were applied to several climate indices associated with the El Niño–Southern Oscillation (ENSO), including the Southern Oscillation Index (SOI) and its component sea level pressure series; the NINO3 sea surface temperature index; and the Northern Oscillation Index (NOI). The best models for each series include a significant long-term nonparametric trend combined with a stochastic stationary cyclic term that clearly delineates the El Niño and La Niña events. There is no evidence that the frequency of ENSO events has changed over the 20th century. The long-term trend, however, has contributed to an apparent increase in the magnitude of recent El Niño events. This trend, potentially related to global warming, has increased the level of each series by an amount equal to 30–50% of the amplitude of their corresponding annual cycle or cyclic ENSO term. Thus, the background sea surface temperature in the eastern equatorial Pacific is more than 0.5°C warmer now than prior to 1950, implying a greater overall impact of El Niño events.

2. Evidence shows that Arctic freshwater river flow to the North Atlantic has increased over the last three decades. Climate models suggest that with an increase in precipitation, this will continue and could significantly weaken the thermohaline circulation. This paper models future river flows under climate change scenarios assuming different rates of future emissions and using different climate models.


**Abstract:** Observational evidence suggests that river inflows to the Arctic Ocean have increased over the last 30 years. Continued increases have the potential to alter the freshwater balance in the Arctic and North Atlantic Oceans and hence the thermohaline circulation. Simulations with a macroscale hydrological model and climate change scenarios derived from six climate models and two emissions scenarios suggest increases of up to 31% in river inflows to the Arctic by the 2080s under high emissions and up to 24% under lower emissions, although there are large differences between climate models. Uncertainty analysis suggests low sensitivity to model form and parameterization but higher sensitivity to the input data used to drive the model. The addition of up to 0.048 sverdrup (Sv, 10^6 m^3 s^−1) is a large proportion of the 0.06–0.15 Sv of additional freshwater that may trigger thermohaline collapse. Changes in the spatial distribution of inflows to the Arctic Ocean may influence circulation patterns within the ocean.
3. Threats to freshwater river biodiversity are intensified by climate change. This study analyzes and classifies the World’s Large River Systems with the expectation that this information will help address the ecological risks associated with further impacts.


**Abstract:** A global overview of dam-based impacts on large river systems shows that over half (172 out of 292) are affected by dams, including the eight most biogeographically diverse. Dam-impacted catchments experience higher irrigation pressure and about 25 times more economic activity per unit of water than do unaffected catchments. In view of projected changes in climate and water resource use, these findings can be used to identify ecological risks associated with further impacts on large river systems.

4. Previous sea level rise models have not considered glaciers on the Antarctic Peninsula because of lack of data. However, this recent study shows that glaciers are receding in Antarctica and will likely contribute to sea level rise. This study combines satellite data and on the ground ice measurements to show that these glaciers are melting at rates up 2 meters per year.


**Abstract:** Satellite radar interferometry data from 1995 to 2004, and airborne ice thickness data from 2002, reveal that the glaciers flowing into former Wordie Ice Shelf, West Antarctic Peninsula, discharge 6.8 ± 0.3 km³/yr of ice, which is 84 ± 30 percent larger than a snow accumulation of 3.7 ± 0.8 km³/yr over a 6,300 km² drainage basin. Airborne and ICESat laser altimetry elevation data reveal glacier thinning at rates up to 2 m/yr. Fifty km from its ice front, Fleming Glacier flows 50 percent faster than it did in 1974 prior to the main collapse of Wordie Ice Shelf. We conclude that the glaciers accelerated following ice shelf removal, and have been thinning and losing mass to the ocean over the last decade. This and other observations suggest that the mass loss from the northern part of the Peninsula is not negligible at present.

5. Climate model results are found to be consistent with observed changes in water mass in the Southern Ocean.


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Abstract: Interdecadal water mass changes in the Indian - Western Pacific sectors of the Southern Ocean were investigated using the Japanese Antarctic Research Expeditions and historical hydrographic observations from the 1950s to 1990s. Freshening and cooling occurred on the neutral density surfaces of 27.0 kg·m$^{-3}$ equatorward of Sub-Antarctic Front. Results for the area south of the Polar Front show warm and saline anomalies and oxygen decreases on the surfaces around 27.9 kg·m$^{-3}$, which correspond to the Upper Circumpolar Deep Water. These latter anomalies are most simply explained by the mixing of these shallow waters with warmer and fresher surface waters. Steric sea level has also increased with an average change of 1mm·yr$^{-1}$ from the 1970s to 1990s. The changes are larger north of the Sub-Antarctic Front, implying a strengthening of the Antarctic Circumpolar Current. It appears that the observed changes are consistent with the results from coupled climate model results for a similar period.

6. Potential collapse of Antarctic marine ecosystem...


Summary: Many key species of the Antarctic marine ecosystem—including krill, the backbone of the food chain—depend on the availability of winter sea ice. If global temperatures continue to rise and the winter ice pack continues to recede, this fragile Antarctic marine ecosystem could face collapse.

7. The authors of this paper used a state-of-the-art general circulation model (GCM) coupled to a dynamic global vegetation model, and have examine the interaction between vegetation and climate variability at annual to decadal timescales.


Abstract: Vegetation is known to interact with the other components of the climate system over a wide range of timescales. Some of these interactions are now being taken into account in models for climate prediction. This study is an attempt to describe and quantify the climate–vegetation coupling at the interannual timescale, simulated with a General Circulation Model (HadSM3) coupled to a dynamic global vegetation model (TRIFFID). Vegetation variability is generally strongest in semi-arid areas, where it is driven by precipitation variability. The impact of vegetation variability on climate is analysed by using multivariate regressions of boundary layer fluxes and properties, with respect to soil moisture and vegetation fraction. Dynamic vegetation is found to significantly increase the variance in the surface sensible and latent heat fluxes. Vegetation growth always causes evapotranspiration to increase, but its impact on sensible heat is less straightforward. The feedback of vegetation on sensible heat is
positive in Australia, but negative in the Sahel and in India. The sign of the feedback depends on the competing influences, at the gridpoint scale, of the turbulent heat exchange coefficient and the surface (stomatal) water conductance, which both increase with vegetation growth. The impact of vegetation variability on boundary layer potential temperature and relative humidity are shown to be small, implying that precipitation persistence is not strongly modified by vegetation dynamics in this model. We discuss how these model results may improve our knowledge of vegetation–atmosphere interactions and help us to target future model developments.

8. “Various studies indicate that the hydrological cycle is speeding up at high northern latitudes. The resulting increase in freshwater flow into the Arctic Ocean is predicted to have long-range effects.” From Nature News and Views.

**Article:** Climate change: Water cycle shifts gear. STOCKER and RAIBLE. Nature 434, 830 - 833 (14 April 2005).
[http://www.nature.com/nature/journal/v434/n7035/index.html](http://www.nature.com/nature/journal/v434/n7035/index.html)

No abstract.

9. **This study shows that corals from Bermuda can be used as to reconstruct North Atlantic climate variability.** This research illustrates that because coral growth is slow and can live a long time, even small Bermuda coral colonies can be used as proxies to reconstruct of NAO variability.


**Abstract:** We present a 55-year-long record (1928–1982) of Sr/Ca in a Bermuda coral (*Diploria strigosa*), which we use to reconstruct local twentieth century climate features. The clearest climate signal emerges for the late-year Sr/Ca. Although the coral was collected in shallow water (12 m), the correlation with station data is highest for temperatures at 50 m depth ($r = -0.70$), suggesting that local temperatures at the collection site are not representative for the sea surface temperatures in the adjacent open ocean. The most striking feature of the coral record is the persistent and significant correlation ($r = -0.50$) with the North Atlantic Oscillation (NAO) index. Field correlations of fall Sr/Ca with the winter sea level pressure (SLP) show the typical spatial NAO pattern. The stable relationship with the NAO shows that Sr/Ca in Bermuda corals is a suitable tool for the reconstruction of North Atlantic climate variability.

10. **This study reports on a new analytical method that allows researchers to reconstruct sea level from corals 250,000 years old.** This new approach estimates a sea-level curve with sufficient temporal resolution to reveal variations that were not previously clear.

[http://www.sciencemag.org/cgi/content/abstract/308/5720/401](http://www.sciencemag.org/cgi/content/abstract/308/5720/401)
**Abstract:** Sea level is a sensitive index of global climate that has been linked to Earth’s orbital variations, with a minimum periodicity of about 21,000 years. Although there is ample evidence for climate oscillations that are too frequent to be explained by orbital forcing, suborbital-frequency sea-level change has been difficult to resolve, primarily because of problems with uranium/thorium coral dating. Here we use a new approach that corrects coral ages for the frequently observed open-system behavior of uranium-series nuclides, substantially improving the resolution of sea-level reconstruction. This curve reveals persistent sea-level oscillations that are too frequent to be explained exclusively by orbital forcing.

11. **US agriculture will be impacted by climate change** – this study models future climate change in the Central US and predicts a warming of (1°–5°C) and variable precipitation.


**Abstract:** A diagnostic analysis of relationships between central U.S. climate characteristics and various flow and scalar fields was used to evaluate nine global coupled ocean–atmosphere general circulation models (CGCMs) participating in the Coupled Model Intercomparison Project (CMIP). To facilitate identification of physical mechanisms causing biases, data from 21 models participating in the Atmospheric Model Intercomparison Project (AMIP) were also used for certain key analyses.

Most models reproduce basic features of the circulation, temperature, and precipitation patterns in the central United States, although no model exhibits small differences from the observationally based data for all characteristics in all seasons. Model ensemble means generally produce better agreement with the observationally based data than any single model. A fall precipitation deficiency, found in all AMIP and CMIP models except the third-generation Hadley Centre CGCM (HadCM3), appears to be related in part to slight biases in the flow on the western flank of the Atlantic subtropical ridge. In the model mean, the ridge at 850 hPa is displaced slightly to the north and to the west, resulting in weaker southerly flow into the central United States.

The CMIP doubled-CO2 transient runs show warming (1°–5°C) for all models and seasons and variable precipitation changes over the central United States. Temperature (precipitation) changes are larger (mostly less) than the variations that are observed in the twentieth century and the model variations in the control simulations.

12. **An abrupt change in climate and lack of oxygen is thought to be responsible for the catastrophic extinction during the Late Permian.**


**Abstract:** A catastrophic extinction occurred at the end of the Permian Period. However, baseline extinction rates appear to have been elevated even before the final
catastrophe, suggesting sustained environmental degradation. For terrestrial vertebrates during the Late Permian, the combination of a drop in atmospheric oxygen plus climate warming would have induced hypoxic stress and consequently compressed altitudinal ranges to near sea level. Our simulations suggest that the magnitude of altitudinal compression would have forced extinctions by reducing habitat diversity, fragmenting and isolating populations, and inducing a species-area effect. It also might have delayed ecosystem recovery after the mass extinction.

13. **An extraordinary research effort in the Amazonstarved a tropical forest of rain and provides a glimpse of the potential effects of climate change.**


No abstract.

14. **Reconstructing past climate variability is key to understanding how climate change will impact the earth. This study uses sediments from tiny marine algae on the ocean floor to reconstruct past sea-surface temperatures.**


**Abstract:** Traditional reconstructions of sea-surface temperatures (SSTs) produced by the Pliocene Research Interpretations and Synoptic Mapping (PRISM) Group indicate that mid-Pliocene surface ocean temperatures were unchanged or slightly cooler than modern at the tropics and low latitudes and significantly warmer at higher latitudes, particularly in the North Atlantic. This change in the latitudinal pattern of SSTs has been attributed to enhanced meridional ocean heat transport generated by more vigorous surface ocean gyres and/or thermohaline circulation (THC). This study derives new SST estimates using the alkenone paleothermometer in the Pacific Ocean. These estimates, combined with published alkenone SST data from two Atlantic sites, are located in tropical and subtropical regions where the distribution of PRISM sites is sparse. A fully coupled ocean-atmosphere general circulation model (OAGCM) running for the mid-Pliocene was also used to predict SST. Significant differences are noted between absolute PRISM SSTs interpolated to our core locations and alkenone-derived SSTs. These differences may be related to errors in the PRISM and alkenone paleothermometry estimates or to regional differences between localities where data was collected. However, the available alkenone and model-based SST estimates are consistent in the sign of temperature change they predict and provide the first indication of warmer SSTs during the mid-Pliocene in the tropics and subtropics. This contrasts with PRISM's estimates of unchanged or slightly cooler SSTs for the same geographical regions. The pattern of SSTs, produced by alkenone estimates and modeling, is not characteristic of that produced by enhanced meridional ocean heat transport or THC. Instead, the pattern is similar to that which might be expected as a result of higher
concentrations of atmospheric CO2, which would act to warm the oceans at the tropics and other latitudes. Furthermore, model diagnostics indicate that reduced sea ice and terrestrial ice sheet extents and a strong ice-albedo feedback played a major role in forcing mid-Pliocene warmth. Further work aimed at validating these conclusions should concentrate on expanding the mid-Pliocene SST data set, particularly at low latitudes, as well as undertaking model/model comparisons to assess model dependency of the results.

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