Atmospheric Chemistry and Physics (ACP)

A tropical West Pacific OH minimum and implications for stratospheric composition

Most of the short-lived biogenic and anthropogenic chemical species that are emitted into the atmosphere break down efficiently by reaction with OH (hydroxyl radicals) and do not reach the stratosphere. In this paper, the authors show the existence of a pronounced minimum in the tropospheric column of ozone over the West Pacific, the main source region for stratospheric air, and suggest a corresponding minimum of the tropospheric column of OH.

Reference

Rex, M. et al.: A tropical West Pacific OH minimum and implications for stratospheric composition, Atmos. Chem. Phys., 14, 4827–4841, 2014

Characterization of submicron aerosols during a month of serious pollution in Beijing, 2013

In January 2013, Beijing experienced several serious haze events. To achieve a better understanding of the characteristics, sources and processes of aerosols during this month, a high-resolution time-of-flight aerosol mass spectrometer was deployed at an urban site between 1 January and 1 February 2013 to obtain the size-resolved chemical composition of non-refractory submicron particles in the air. The results are reported in this paper.

Reference

Zhang, J. K. et al.: Characterization of submicron aerosols during a month of serious pollution in Beijing, 2013, Atmos. Chem. Phys., 14, 2887–2903, 2014

Effects of stratospheric ozone recovery on photochemistry and ozone air quality in the troposphere

In this study, the authors examine the implications of stratospheric ozone recovery for the chemistry and ozone air quality of the troposphere with a global chemical transport model (GEOS-Chem).

Reference

Zhang, H. et al.: Effects of stratospheric ozone recovery on photochemistry and ozone air quality in the troposphere, Atmos. Chem. Phys., 14, 4079–4086, 2014

Uncertainty analysis of projections of ozone-depleting substances: mixing ratios, EESC, ODPs, and GWPs

Here the authors present a comprehensive uncertainty analysis of the future mixing ratios of ozone-depleting substances (ODPs), levels of equivalent effective stratospheric chlorine (EESC), ozone depletion potentials, and global warming potentials (GWPs).

Reference

Velders, G. J. M. and Daniel, J. S.: Uncertainty analysis of projections of ozone-depleting substances: mixing ratios, EESC, ODPs, and GWPs, Atmos. Chem. Phys., 14, 2757–2776, 2014

Biogeosciences (BG)

Subsurface pH and carbonate saturation state of aragonite on the Chinese side of the North Yellow Sea: seasonal variations and controls

Based on eight field surveys conducted between May 2011 and May 2012, a team investigated seasonal variations in pH, carbonate saturation state of aragonite, and ancillary data on the Chinese side of the North Yellow Sea. They report the results in this paper.

Reference

Zhai, W.-D. et al.: Subsurface pH and carbonate saturation state of aragonite on the Chinese side of the North Yellow Sea: seasonal variations and controls, Biogeosciences, 11, 1103–1123, 2014.

Exploring local adaptation and the ocean acidification seascape – studies in the California Current Large Marine Ecosystem

This study explores local adaptation to ocean acidification. It focuses on the recent efforts by the Ocean Margin Ecosystems Group for Acidification Studies research consortium to characterise a portion of the California Current Large Marine Ecosystem.

Reference

Hofmann, G. E. et al.: Exploring local adaptation and the ocean acidification seascape – studies in the California Current Large Marine Ecosystem, Biogeosciences, 11, 1053–1064, 2014

BACK TO CONTENTS

Climate of the Past (CP)

Modelling global-scale climate impacts of the late Miocene Messinian Salinity Crisis

By running extreme, sensitivity-type experiments with a fully coupled ocean–atmosphere general circulation model, this paper investigates the potential of various Messinian Salinity Crisis Mediterranean Outflow Water scenarios to impact global-scale climate.

Reference

Ivanovic, R. F. et al.: Modelling global-scale climate impacts of the late Miocene Messinian Salinity Crisis, Clim. Past, 10, 607–622, 2014

The challenge of simulating the warmth of the mid-Miocene climatic optimum in CESM1

In this paper, the authors use the recently released Community Earth System Model (CESM1.0) with a slab ocean to simulate the mid-Miocene climatic optimum, incorporating recent Miocene CO_2 reconstructions of 400 ppm (parts per million).

Reference

Goldner, A., Herold, N., and Huber, M.: The challenge of simulating the warmth of the mid-Miocene climatic optimum in CESM1, Clim. Past, 10, 523–536, 2014.

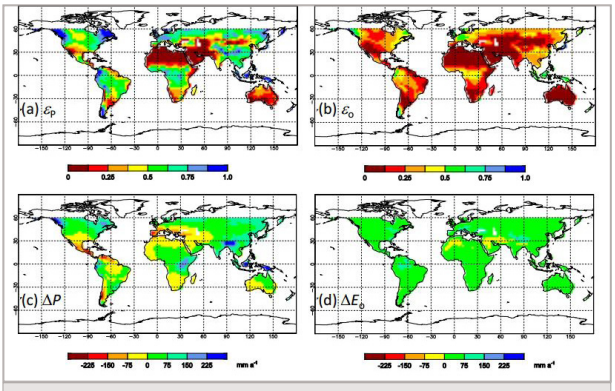
Hydrology and Earth System Sciences (HESS)

A general framework for understanding the response of the water cycle to global warming over land and ocean

In developing a simple framework for how the water cycle responds to warming on a local scale, the authors of this study found that the climate model output shows a remarkably close relation to the long-standing Budyko framework of catchment hydrology.

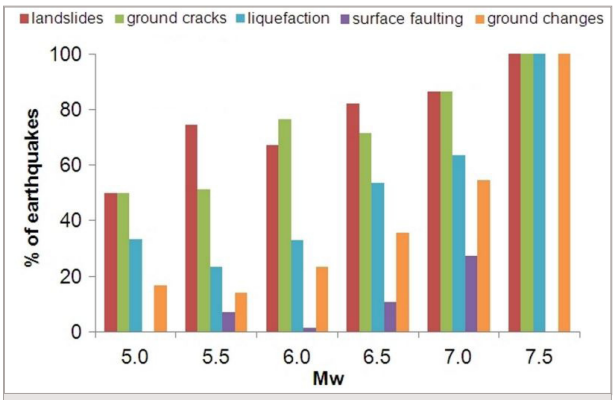
Reference

Roderick, M. L. et al.: A general framework for understanding the response of the water cycle to global warming over land and ocean, Hydrol. Earth Syst. Sci., 18, 1575–1589, 2014



Comparison of Δ(P - E) estimated using the Budyko-based framework versus Δ(P - E) calculated from climate model output. P: Mean annual global precipitation. E: Mean annual global evaporation. (Credit: Roderick et al., 2014)

Natural Hazards and Earth System Sciences (NHESS)



Percentage of earthquakes in each magnitude class for which a specific type of ground failure was reported. (Credit: Martino et al., 2014)

Earthquake-induced ground failures in Italy from a reviewed database

This paper presents and analyses a database of earthquake-induced ground failures in Italy. The catalogue collects data regarding landslides, liquefaction, ground cracks, surface faulting and ground changes triggered by earthquakes of Mercalli epicentral intensity 8 or greater that occurred in the last millennium in Italy.

Reference

Martino, S., Prestininzi, A., and Romeo, R. W.: Earthquake-induced ground failures in Italy from a reviewed database, Nat. Hazards Earth Syst. Sci., 14, 799–814, 2014

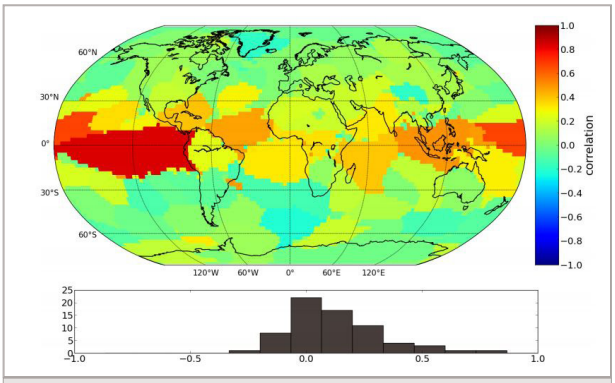
Nonlinear Processes in Geophysics (NPG)

Regional and inter-regional effects in evolving climate networks

In this study, the authors identify the sources of the evolving network characteristics by considering a reduced-dimensionality description of the climate system using network nodes given by rotated principal component analysis. The time evolution of structures in local intra-component networks is studied and compared to evolving inter-component connectivity.

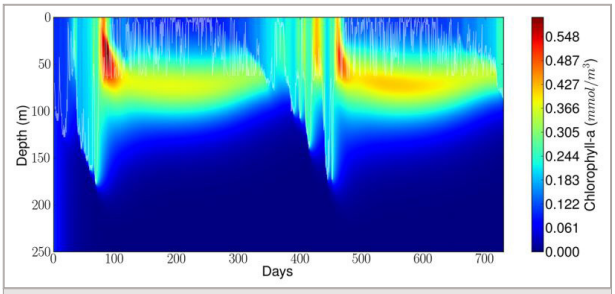
Reference

Hlinka, J. et al.: Regional and inter-regional effects in evolving climate networks, Nonlin. Processes Geophys., 21, 451–462, 2014



Regions that show high relevance for the global graph evolution. (Credit: Hlinka et al., 2014)

Ocean Science (OS)



Time–depth plot of chlorophyll at Bermuda, showing the clear subsurface chlorophyll maxima. (Credit: Hill et al., 2014)

Adapting to life: ocean biogeochemical modelling and adaptive remeshing

Here, a team of researchers presents a novel method of simulating ocean biogeochemical behaviour on a vertically adaptive computational mesh, where the mesh changes in response to the biogeochemical and physical state of the system throughout the simulation.

Reference

Hill, J. et al.: Adapting to life: ocean biogeochemical modelling and adaptive remeshing, Ocean Sci., 10, 323–343, 2014

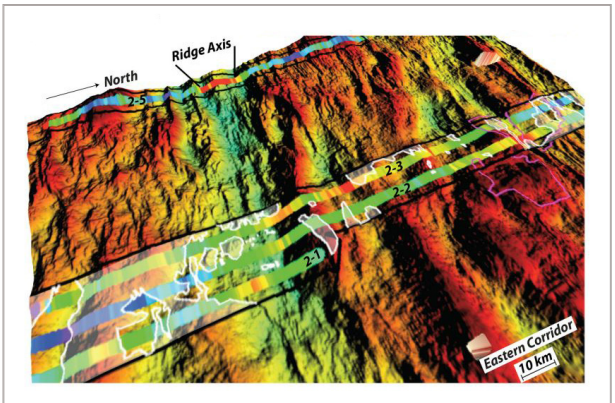
Solid Earth (SE)

Magnetic signature of large exhumed mantle domains of the Southwest Indian Ridge – results from a deep-tow geophysical survey over 0 to 11 Ma old seafloor

This study investigates the magnetic signature of ultramafic seafloor in the eastern part of the Southwest Indian Ridge. Over a 11 Myr period, detachment faulting has exhumed large areas of mantle-derived rocks in this region.

Reference

Bronner, A. et al.: Magnetic signature of large exhumed mantle domains of the Southwest Indian Ridge – results from a deep-tow geophysical survey over 0 to 11 Ma old seafloor, Solid Earth, 5, 339–354, 2014



Three-dimensional bathymetric view of one of the survey areas. Full image and colour code available in the paper. (Credit: Bronner et al. 2014)

BACK TO CONTENTS

The Cryosphere (TC)

Mer de Glace (Sea of Ice), located on the northern slopes of the Mont Blanc, is one of the best known Alpine glaciers. (Credit: Stergios Misios, distributed via imaggeo.egu.eu)

Modelling environmental influences on calving at Helheim Glacier in eastern Greenland

Calving is an important mass-loss process for many glaciers worldwide, and has been assumed to respond to a variety of environmental influences. This paper applies a grounded, flowline tidewater glacier model, using a physically based calving mechanism to Helheim Glacier, eastern Greenland.

Reference

Cook, S. et al.: Modelling environmental influences on calving at Helheim Glacier in eastern Greenland, The Cryosphere, 8, 827–841, 2014

Little Ice Age climate reconstruction from ensemble reanalysis of Alpine glacier fluctuations

Here the author analyses terminus position histories from an ensemble of seven glaciers in the Alps with a macroscopic model of glacier dynamics to derive a history of glacier equilibrium line altitude for the time span 400–2010 C.E..

Reference

Lüthi, M. P.: Little Ice Age climate reconstruction from ensemble reanalysis of Alpine glacier fluctuations, The Cryosphere, 8, 639–650, 2014

Fracture-induced softening for large-scale ice dynamics

To account for the macroscopic effect of fracture processes on large-scale viscous ice dynamics (i.e., ice-shelf scale), the authors apply a continuum representation of fractures and related fracture growth into the prognostic Parallel Ice Sheet Model and compare the results to observations.

Reference

Albrecht, T. and Levermann, A.: Fracture-induced softening for large-scale ice dynamics, The Cryosphere, 8, 587–605, 2014