

Marine scientists use JeDI to create world's first global jellyfish database

An international study, led by the University of Southampton, has led to the creation of the world's first global database of jellyfish records to map jellyfish populations in the oceans.

Scientific and media debate regarding future trends, and subsequent ecological, biogeochemical and societal impacts, of jellyfish and jellyfish blooms in a changing ocean is hampered by a lack of information about jellyfish biomass and distribution from which to compare.

To address this knowledge gap, scientists used the Jellyfish Database Initiative, or JeDI, to map jellyfish biomass in the upper 200m of the world's oceans and explore the underlying environmental causes driving the observed patterns of distribution.

“The successful development of this first global-scale database of jellyfish records by the Global Jellyfish Group was due, in large part, to the incredible generosity of members in the international jellyfish and wider scientific communities,” says lead author of the study Dr Cathy Lucas, a marine biologist from the University of Southampton.

“With this resource, anyone can use JeDI to address questions about the spatial and temporal extent of jellyfish populations at local, regional and global scales, and the potential implications for ecosystem services and biogeochemical processes,” adds Dr Rob Condon of the University of North Carolina Wilmington in the USA.

Using data from JeDI, the authors were able to show that jellyfish and other gelatinous zooplankton are present throughout the world's oceans, with the greatest concentrations in the mid-latitudes of the Northern Hemisphere. In the North Atlantic Ocean, dissolved oxygen and sea surface temperature were found to be the principal drivers of jellyfish biomass distribution.

The spatial analysis carried out by the researchers is an essential first step in the establishment of a consistent database of gelatinous presence from which future trends can be assessed and hypotheses tested, particularly those relating multiple regional and global drivers of jellyfish biomass. It complements the findings of a 2013 study, led by Dr Condon, in which global jellyfish populations were shown to exhibit fluctuations over multidecadal time-scales centred round a baseline. “If jellyfish biomass does increase in the future, particularly in the Northern Hemisphere, this may influence the abundance and biodiversity of zooplankton and phytoplankton, having a knock-on effect on ecosystem functioning, biogeochemical cycling and fish biomass,” says Dr Condon.

The Jellyfish Database Initiative, or JeDI, is the first scientifically-coordinated global-scale database of jellyfish records, and currently holds over 476,000 data items on jellyfish and other gelatinous taxa. JeDI has been designed as an open-access database for all researchers, media and public to use as a current and future research tool and a data hub for general information on jellyfish populations. It is housed at the National Center for Ecological Analysis and Synthesis (NCEAS) USA, a cross-discipline ecological and data synthesis research centre affiliated with the

University of California, Santa Barbara, and can be accessed and searched at <http://jedi.nceas.ucsb.edu>.

The continued development of JeDI and a re-analysis several decades from now will enable science to determine whether jellyfish biomass and distribution alter as a result of anthropogenic climate change.

The results of the study, led by Dr Lucas, appear in the latest issue of *Global Ecology and Biogeography* (DOI: 10.1111/geb.1269). Her co-authors include Dr Daniel Jones of the National Oceanography Centre, UK and members of the Global Jellyfish Group, a consortium of approximately 30 researchers from around the globe with specialisms in gelatinous organisms, climatology, oceanography and times-series analyses, and including lead co-authors Dr Rob Condon of the University of North Carolina, Wilmington in the USA, Professor Carlos Duarte of the University of Western Australia's Oceans Institute and the Instituto Mediterráneo de Estudios Avanzados (IMEDEA) in Spain and Dr Kylie Pitt of Griffith University in Australia.

Ends

Notes for editors:

1. The *Global Ecology and Biogeography* article (DOI: 10.1111/geb.1269) 'Gelatinous zooplankton biomass in the global oceans: geographic variation and environmental drivers' by Cathy H. Lucas, Daniel O. B. Jones, Catherine J. Hollyhead, Robert H. Condon, Carlos M. Duarte, William M. Graham, Kelly L. Robinson, Kylie A. Pitt, Mark Schildhauer and Jim Regetz is available from Media Relations on request.

2. Images depicting examples of jellyfish are available from Media Relations on request. Media should acknowledge the appropriate people when using these files.

3. Ocean and Earth Science at the University of Southampton has a well-established reputation for outstanding research and teaching. Our unique waterfront campus at the National Oceanography Centre, Southampton attracts prominent researchers and educators from around the world, who join us to work within the areas of geochemistry, geology and geophysics, ocean biodiversity, geochemistry and ecosystems, physical oceanography, palaeoceanography and palaeoclimate, and coastal and shelf seas.

Through degree programmes in oceanography, marine biology, geology and geophysics, our students have access to ships, ocean technology and opportunities for fieldwork and scientific cruises not traditionally found in standard university environments.

4. The University of Southampton is a leading UK teaching and research institution with a global reputation for leading-edge research and scholarship across a wide range of subjects in engineering, science, social sciences, health and humanities.

With over 23,000 students, around 5,000 staff, and an annual turnover well in excess of £435 million, the University of Southampton is acknowledged as one of the country's top institutions for engineering, computer science and medicine. We

combine academic excellence with an innovative and entrepreneurial approach to research, supporting a culture that engages and challenges students and staff in their pursuit of learning. <http://www.southampton.ac.uk/>

For further information:

University of Southampton, UK

Glenn Harris, Media Relations Officer, University of Southampton, UK.

Tel: +44 (0)23 8059 3212; email: G.Harris@soton.ac.uk

University of North Carolina Wilmington, USA

Tara Romanella, University Relations, University of North Carolina Wilmington, USA.

Tel: +001 910 962 3616; email: our@uncw.edu

University of Western Australia

Dr Sally-Ann Jones, Media Liaison Public Affairs, The University of Western Australia, Perth, Australia.

Tel: +61 8 6488 7975 or 0488 631 286; email: sally.jones@uwa.edu.au

Griffith University, Australia

Helen Wright, Senior Communications Officer, Griffith University, Australia.

Tel: +61 7 3735 4288; email: Helen.Wright@griffith.edu.au

IMAGES:

Figure showing examples of jellyfish populations from around the world. **Top row:** **(left)** World map showing the location of jellyfish data held in the Jellyfish Database Initiative, JeDI; **(right)** Stranding of *Chrysaora plocamia* jellyfish on a beach in Patagonia, Argentina (Photo credit: Dr Hermes Mianzan). **Middle row:** **(left)** A pelican swimming among a bloom of *Catostylus* in Australia (Photo credit: Dr Kylie Pitt); **(right)** Moon jellyfish (*Aurelia*) beach stranding at San Francisco in Nov 2010 (Photo credit: Ocean Beach Bulletin). **Bottom row:** Golden jellyfish (*Mastigias*) jellyfish in Jellyfish Lake, Palau (Photo credit: Chris Lubba).

