Global DYnamcis of climate Variability and impacts on east Asia (DYVA)

The vast majority of China's population of 1.3bn lives in the eastern and southeastern parts of the country. During the last few decades Eastern/Southeastern China has undergone industrial and infrastructure development on a hitherto unprecedented scale. Whilst lifting hundreds of millions of people out of poverty, this development also puts an enormous strain on water resources and on air quality. This densely populated region is also prone to both devastating floods and extreme drought/heat waves with significant socio-economic impacts.

The Yangtze River flood of 1931 is acknowledged as the worst natural disaster in recorded history with an estimated 2-4 million deaths. Death rates are fortunately much reduced these days but even now major floods often have a significant death toll.

In the DYVA project we are examining causes for extreme floods and droughts over Eastern/Southeastern China. Emphasis will be on understanding how past extreme events developed and on identifying possible early warning signs in, for example, anomalously warm or cold ocean temperatures in the Indian, Pacific and Atlantic Oceans or anomalous snow cover over the Tibetan Plateau. This will improve our ability to forecast and to be better prepared for such events.

National Oceanography Centre

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DYVA is a three-year NOC led project involving the University of Reading, National Centre of Atmospheric Science (NCAS) and the Institute of Atmosphere Physics in Beijing. DYVA is funded under the Newton Fund Weather and Climate Science for Service Partnership Programme (CSSP) (metoffice.gov.uk/research/collaboration/newton) which is managed by the UK Met Office.

Scientists at NOC will use observational datasets to study documented events that had a damaging effect over China. Emphasis is on devastating events, such as the aforementioned Yangtze floods or 1931, but also on much more recent events such as the major floods in 1998, 2010 and 2014 for which we have much more complete observational databases. Particular emphasis will be on identifying precursors for such events. On the search of such precursor signals we are looking at possible local and remote effects. The weather conditions experienced at any particular location/region (here Eastern/Southeastern China) being part of the large scale atmospheric circulation means that we have to consider possible remote influences when trying to understand regional events. Indeed, flood or drought conditions over Eastern China can have their origin further upstream of the prevailing winds – on the Tibetan Plateau, the Indian Ocean or even in the Atlantic and Pacific Oceans. State-of-the-art computer models of the ocean and atmosphere developed at NOC and the UK Met Office will be used to understand the physical mechanisms linking conditions in Eastern/Southeastern China to remote regions. This will contribute to better forecasting capabilities of droughts and floods.

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