

Leigh MacPherson - Curriculum Vitae

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Profile

PhD Candidate at the University of Siegen with an in-depth background in physical oceanography research, specifically focussed on coastal process, extreme sea levels, numerical and statistical modelling, flood risk, and dispersal modelling.

Education/Qualifications

PhD Candidate | University of Siegen | 2017 - present

Statistical and numerical techniques were developed to improve our understanding of extreme sea level occurrence along the German Baltic Sea coast. Such techniques were also used to extend the available water level data in the region for use in flood risk analyses, and incorporate historical information to better classify and represent statistical outliers such as the storm surge of 1872.

Master of Philosophy | University of Western Australia | 2015 - 2016

The dispersal of drift algae over an aquaculture lease in Flinders Bay, Western Australia, was studied using advanced numerical techniques. Hydrodynamic and dispersal models were used to highlight areas of high drift algae concentration, leading to improved planning of the future expansion of the lease site.

Bachelor of (Civil) Engineering | University of Western Australia | 2007 - 2010

Relevant Experience

Research Officer | University of Western Australia | 2013 - 2015

A hydrodynamic and drift model was used to simulate sea-wrack transport in the Two-Rocks region of Western Australia, to determine the processes leading to the accumulation and removal of wrack on beaches near the Two-Rocks marina. The model was used to analyse possible re-designs of the marina, aiming to reduce the accumulation of sea-wrack on the near-by beaches.

Research Assistant | University of Western Australia | 2010 - 2012

Return water levels along the entire Australian coastline were determined using a nation-wide hydrodynamic model. A 61-year hindcast of sea levels was conducted using a nation-wide hydrodynamic model, providing temporally and spatially explicit water level data. The effect of tropical cyclones was later incorporated by simulating stochastically generated atmospheric conditions.

Publications

- Höffken, J., Vafeidis, A., MacPherson, L., & Dangendorf, S. (2019, January). Modelling the influence of temporal variability of storm surges on coastal flood characteristics. In *Geophysical Research Abstracts* (Vol. 21).
- MacPherson, L. R., Arns, A., Dangendorf, S., Vafeidis, A. T., & Jensen, J. (2019). A stochastic extreme sea level model for the German Baltic Sea coast. *Journal of Geophysical Research: Oceans*, 124(3), 2054-2071.
- Haigh, I. D., MacPherson, L. R., Mason, M. S., Wijeratne, E. M. S., Pattiaratchi, C. B., Crompton, R. P., & George, S. (2014). Estimating present day extreme water level exceedance probabilities around the coastline of Australia: tropical cyclone-induced storm surges. *Climate Dynamics*, 42(1-2), 139-157.
- Haigh, I. D., Wijeratne, E. M. S., MacPherson, L. R., Pattiaratchi, C. B., Mason, M. S., Crompton, R. P., & George, S. (2014). Estimating present day extreme water level exceedance probabilities around the coastline of Australia: tides, extra-tropical storm surges and mean sea level. *Climate Dynamics*, 42(1-2), 121-138.
- Mémin, A., Watson, C., Haigh, I. D., Macpherson, L., & Tregoning, P. (2014). Non-linear motions of Australian geodetic stations induced by non-tidal ocean loading and the passage of tropical cyclones. *Journal of Geodesy*, 88(10), 927-940.
- MacPherson, L. R., Haigh, I. D., & Pattiaratchi, C. (2011). Coastal flooding in the Peel Harvey Estuary and the effects of mean sea level rise. In *Coasts and Ports 2011: Diverse and Developing: Proceedings of the 20th Australasian Coastal and Ocean Engineering Conference and the 13th Australasian Port and Harbour Conference* (p. 446). Engineers Australia.

Referees

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