BSG Grant reports

Timing of geomorphic disturbance in relation to plant phenology in the Bay of Fundy

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Storminess and precipitation extremes are expected to increase with global warming (Donat et al., 2011, Kovats et al., 2014) with unknown consequences for biogeomorphic ecosystems such as dunes, salt marshes and riparian forests. Also the timing of maximum river discharge, coastal flooding and thus sediment transport is likely to change. Blöschl et al (2017) have recently shown that the timing of the annual river flood peaks has been changing across Europe depending on changes in weather pattern. This poses new questions on how vegetation in biogeomorphic systems at land-water interfaces will be affected by this temporal shift in disturbance regimes.

To study timing and seasonality of physical disturbance to vegetation we require autonomous data loggers that are able to directly measure physical disturbance to plants across seasons. BSG has provided £998 to pilot the use of data loggers during a two week field campaign at the macrotidal salt marshes at the Bay of Fundy in Canada. With travel support from Glasgow University's mobility scheme Thorsten has spent two weeks in June 2018 up and down the Bay of Fundy in collaboration with Gail Chmura from McGill University. A newly developed logger setup was tested in combination with hydrodynamic measurements and flood level monitoring in Scotland and at the Bay of Fundy. Seedling establishment was surveyed in the Bay of Fundy using a differential GPS provided by McGill University to investigate elevational pattern along a tidal range gradient as a result of physical disturbance.
BSG funding was essential to kick-start and implement this project by testing accelerometers on a flexible platform, directly measuring movement of the device due to waves and currents. Temperature and light loggers were installed alongside the accelerometer to measure microclimatic conditions at the site. This setup will be tested and calibrated further and used in the future to collect long-term monitoring data on the relationship between physical disturbance and microclimate in coastal environments across different climtes. Future funding applications have been submitted based on this research.

Photos: Macrotidal salt marsh at the Bay of Fundy. Current meter and newly developed logger setup to monitor physical disturbance and microclimate across seasons in tidal marshes.

Literature:

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