

Understanding river channel change dynamics in Patagonian river systems using remote sensing and GIS

Background

The importance of interactions between river system processes, flood risk, anthropogenic disturbance and in-channel and riparian vegetation is key to understanding landscape dynamics and sustainable environmental management. Despite the significance of the eastward-draining river systems of Patagonia in supporting urban development and agriculture by regulation and irrigation, studies of their hydrological and geomorphological characteristics are scarce, and the patterns and rates of geomorphological changes are poorly understood. River regulation by dams, extraction of water for irrigation and the introduction of non-native vegetation are all significant anthropogenic disturbances in these river systems.

In recent years substantial advances have been made in our ability to map, quantify and understand river channel dynamics in large rivers using remotely sensed data. Despite their limited spatial resolution recent studies have shown that Landsat data provide an opportunity to chart changes in river channel position and riparian vegetation over the last thirty years (Henshaw et al., 2013).

The aims of this project, which would be a part of increased collaboration between DGES and colleagues in Patagonia, would be:

- 1) To quantify the rates nature of geomorphological processes in the Rio Negro and Rio Chubut, Patagonia over the past thirty years, including meander growth and development, meander neck cut-off, avulsion and changes in channel width.
- 2) To assess spatio-temporal changes in riparian vegetation along these rivers.
- 3) To assess changes in flood risk associated with changes in channel morphology.

Henshaw, A. J., Gurnell, A. M., Bertoldi, W., & Drake, N. A. (2013). An assessment of the degree to which Landsat TM data can support the assessment of fluvial dynamics, as revealed by changes in vegetation extent and channel position, along a large river. *Geomorphology*, 202, 74-85.

Personal specification:

Essential:

An undergraduate degree (II:i or higher) in any Physical Geography or Earth Science related subject. Experience in using GIS and remote sensing software packages and evidence of having studied fluvial geomorphology.

Desirable:

A Masters degree awarded at the Merit level or higher in any Physical Geography, Earth Science or Computer Science-related subject.

Further information:

For further information specific to the project, please contact Hywel Griffiths (hmg@aber.ac.uk)

For application forms and procedures, please go to the Department's Postgraduate Student webpage and the University's Postgraduate Student webpage.

Your application form needs to be accompanied by two references (although these can be sent separately following the form if time is tight) and a research proposal, typically ~ 1500 words outlining your project.