Geophysical Research Abstracts
Vol. 16, EGU2014-11209, 2014
EGU General Assembly 2014

Using the CAESAR-Lisflood and SIBERIA landform evolution models to assess the evolution of a post-mining landscape at millennial time scales.

John Lowry (2), Greg Hancock (3), and Tom Coulthard (1)

(1) University of Hull, Department of Geography, Environment and Earth Science, Hull, United Kingdom (t.coulthard@hull.ac.uk), (2) Supervising Scientist Division, Department of the Environment, Darwin NT 0801, Australia, (3) School of Environmental and Life Sciences, University of Newcastle, Australia

A significant goal of mine closure is the development of an erosionally stable landform that functionally merges with the surrounding landscape. Poor landform design may result in severe erosion and gullying which may deliver excess sediment to the surrounding undisturbed landscape. In addition, erosion may result in the exposure of hazardous material that was intended to be contained within the landform over geological time, thereby posing an environmental risk. These risks mean that it is important that the erosional stability of a landform be carefully assessed. In this study, a conceptual rehabilitated landform of the ERA Ranger Uranium Mine is assessed over a 1000-year period using both the SIBERIA and CAESAR-Lisflood computer-based landscape evolution models. Utilising two models enables both an independent evaluation of likely landscape evolution processes and the relative performance and output of each model. Overall findings show that SIBERIA and CAESAR-Lisflood produce erosion rates and patterns that are broadly similar. At millennial time scales, short-term processes such as gullying appear to be the dominant erosion features on the proposed landform, resulting in substantial erosion features in terms of size and amount of hillslope material eroded and transported downslope. Overall both models produce very similar results providing confidence in the models themselves, parameterisation and predictions. The results highlight the usefulness of such modelling in terms of design assessment.