

A rare occurrence of landslides initiated by an extreme event in March 2007 in the Alligator Rivers Region, Australia

M. J. SAYNOR¹, WAYNE D. ERSKINE^{1,2}, G. STABEN³ & J. LOWRY¹

1 Physico-Chemical Processes Group, Environmental Research Institute of the Supervising Scientist, GPO 461, Darwin NT 0801, Australia

mike.saynor@environment.gov.au

2 School of Environmental & Life Sciences, The University of Newcastle, PO Box 127, Ourimbah NSW 2258, Australia

3 Department of Natural Resources, Environment, the Arts and Sport, Northern Territory Government, Darwin, NT, Australia

Abstract The wettest water year on record at Jabiru Airport (2600 mm) in northern Australia occurred in 2006/07. A total of 1940 mm of rain fell in February and March 2007, with 737 mm occurring over 72 h between 28 February and 2 March. This rainfall and the associated flood event had return periods of at least 1:100 years on the annual maximum series. At least 49 landslides occurred on well vegetated, exhumed olivine dolerite surfaces surrounded by quartzose sandstone in the East Alligator River drainage basin. The number, extent, morphometry and soil properties of the landslides were determined using remote sensing imagery, combined with field and laboratory measurements. No evidence of previous mass movements on dolerite was found. The frequency of these mass movements is certainly much rarer than 1:100 years. Mass movements have not previously been considered a significant sediment source in this area because of their truly rare occurrence.

Key words mudslides; debris slides; landslide frequency; olivine dolerite; clay soils; extreme events