SINATRA: Susceptibility of catchments to INTense RAinfall and flooding

SINATRA aims to advance scientific understanding of the processes determining the probability, incidence, and impacts of flooding from intense rainfall (FFIR)

Extreme rainfall events may only last for a few hours, but can generate extraordinarily destructive floods. Their impact can be affected by a wide range factors. The complexity, speed and lack of field measurements on FFIR make it difficult to create computer models to predict flooding and often we are uncertain as to their accuracy. In addition there is no consensus on how to identify how particular catchments may be vulnerable to FFIR.

Project SINATRA will:

1. identify and characterise the processes determining the probability, incidence and magnitude of FFIR through innovative use of historical data sources, new field investigations, and state-of-the-art modelling;

2. develop new modelling architectures, parameterisations, and data assimilation routines to better represent FFIR processes and reduce uncertainty about catchment susceptibility to FFIR;

3. improve understanding, measurement, and prediction of FFIR impacts and the differential local vulnerabilities to them on a catchment by catchment basis;

4. translate those improvements in science into the foundations for practical tools (to be further developed in WP3 as specified by the AO) for FFIR management

In so doing SINATRA will deliver a step-change in both scientific understanding of flooding from intense rainfall and in operational capabilities for managing the risks it poses to life and property.

SINATRA partners in Geography Newcastle are Prof. Andy Russell, Dr, Andy Large and Dr Matt Perks. They are part of the FLood Action Team (FloAT SINATRA) and mobilise to record the hydrodynamics of FFIR event. Portable equipment is used to monitor rising limb, peak (or as near to peak as practicable) flow depths, velocities and suspended sediment loads. FloAT operates across mainland UK, and will record key FFIR processes and collect 'immediate' time-limited post flood data (e.g. flood levels, sediment/debris distribution/volume/calibre). Following the FFIR rapid (hrs-days) post-flood surveys will capture essential evidence of system response to FFIR, such as trashlines and major changes in flood channel morphology using dGPS and robotic Total Station. Remote sensing from airborne LiDAR will be used to quantify post-event inundation area and morphological change by comparing to pre-FFIR data sets. A detailed description of the project can be found here.