IMPACT FORECASTING
Introducing a new project for 2017-2019

Harald Richter[1], Craig Arthur[2], Martin Wehner[2], Claire Krause[2], Jane Sexton[2], Beth Ebert[1], Jeff Kepert[1], Shoni Maguire[1], Mark Dunford[2], Russel Hay[2], Mark Edwards[2]

(1) Bureau of Meteorology, Melbourne VIC   (2) Geoscience Australia, Canberra, ACT

Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

Australian Government
Geoscience Australia

Australian Government
Bureau of Meteorology

PROJECT OBJECTIVE

To develop a pilot capability that will make useful predictions of community impacts of extreme weather with the goal of improving timely mitigating actions by a range of stakeholders.

abc.net.au TC Yasi

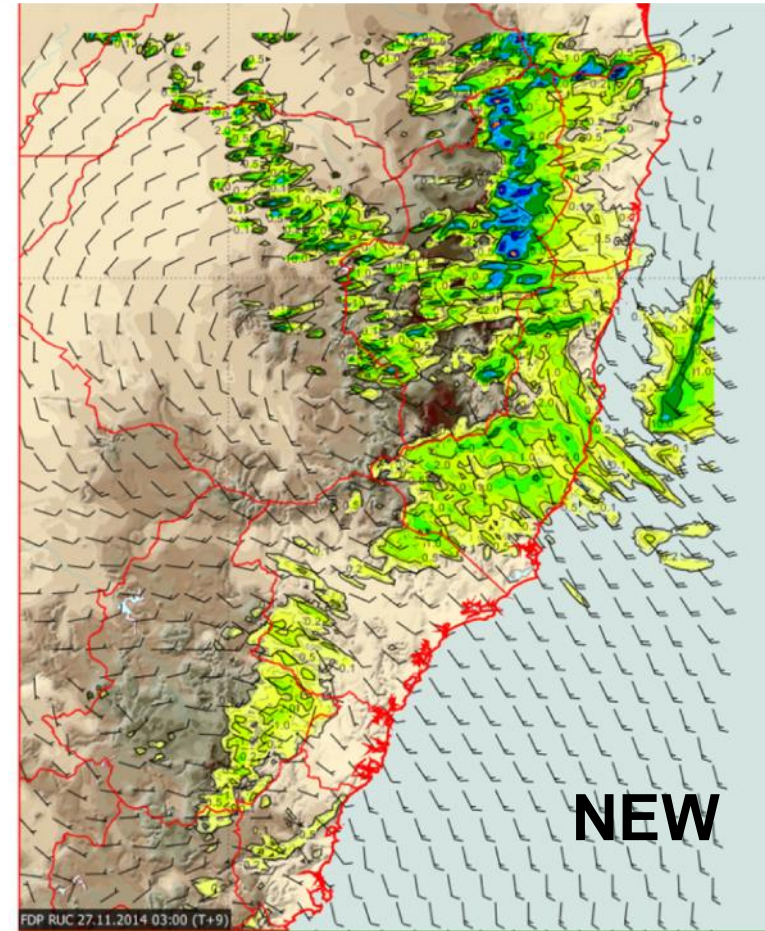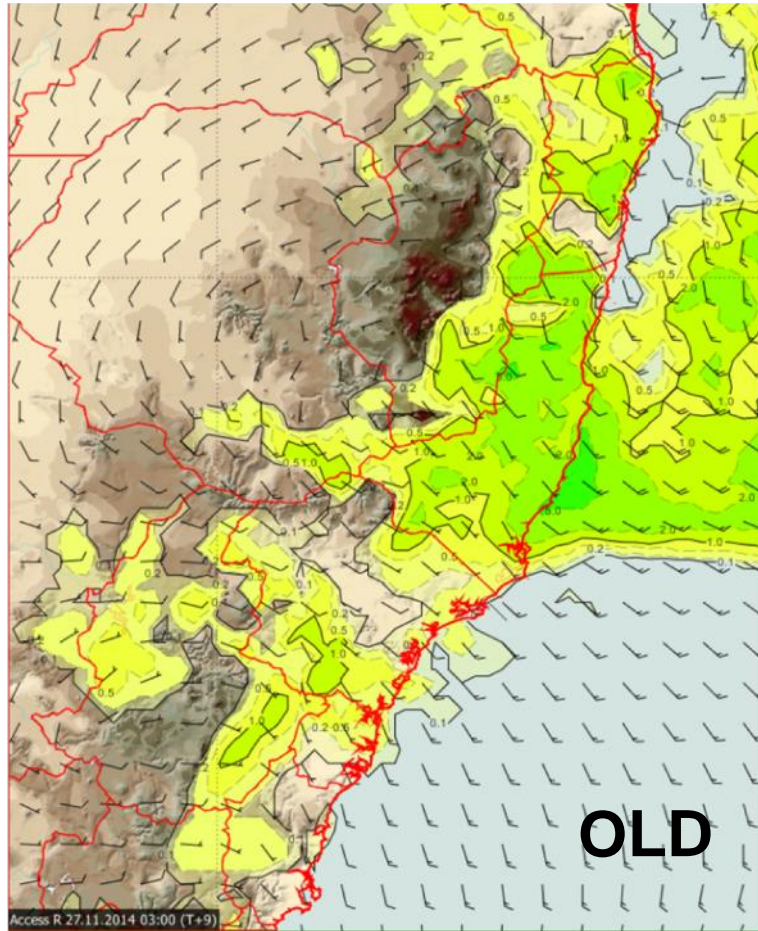couriermail.com.au, QLD 2011 floods
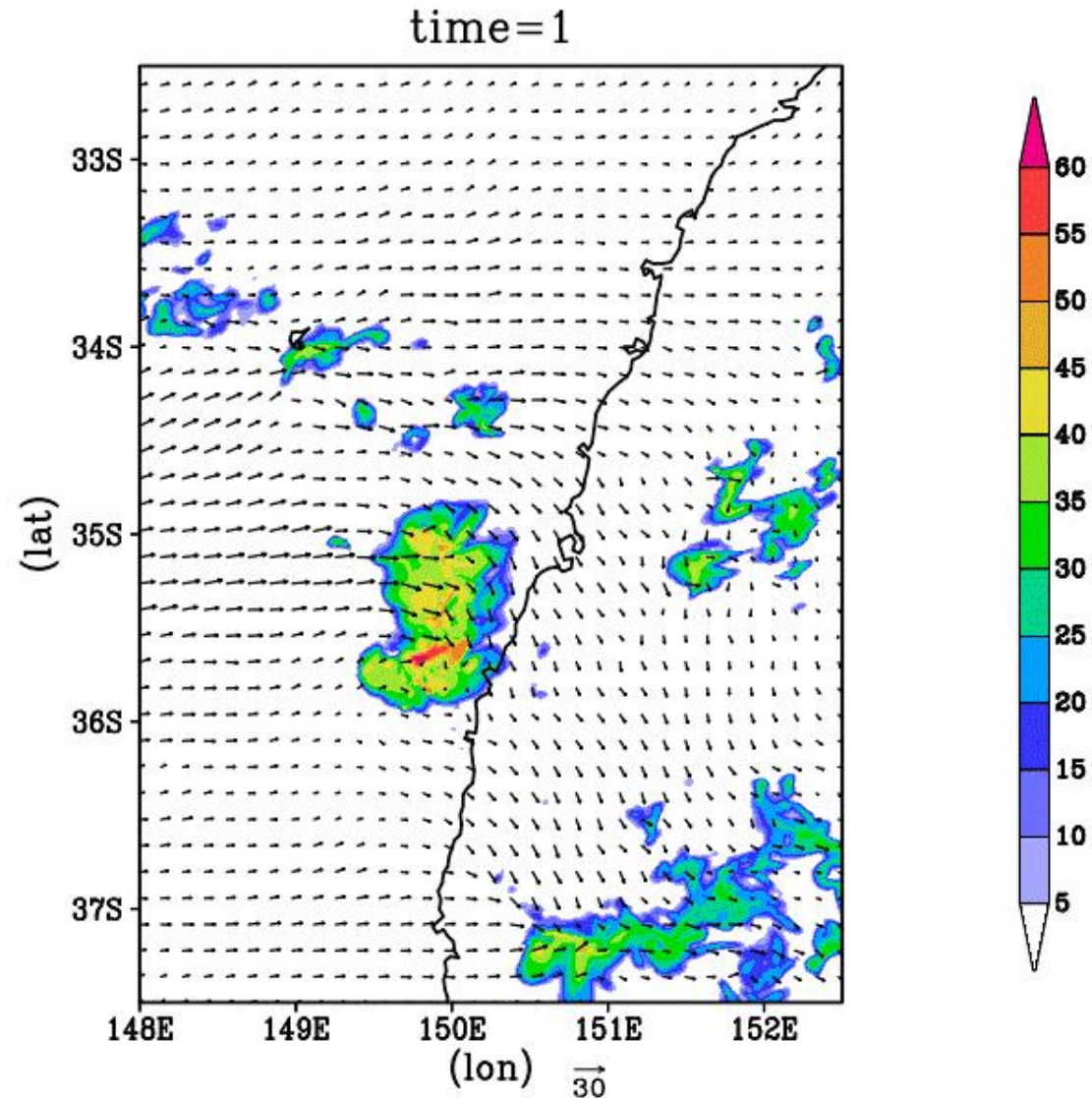

abc.net.au 2016 storm SA

smh.com.au TC Larry 2006

REGIONAL WIND FIELD
NEW BUREAU HIGH-RESOLUTION MODELS

OLD

Access R 27.11.2014 03:00 (T+9)

NEW

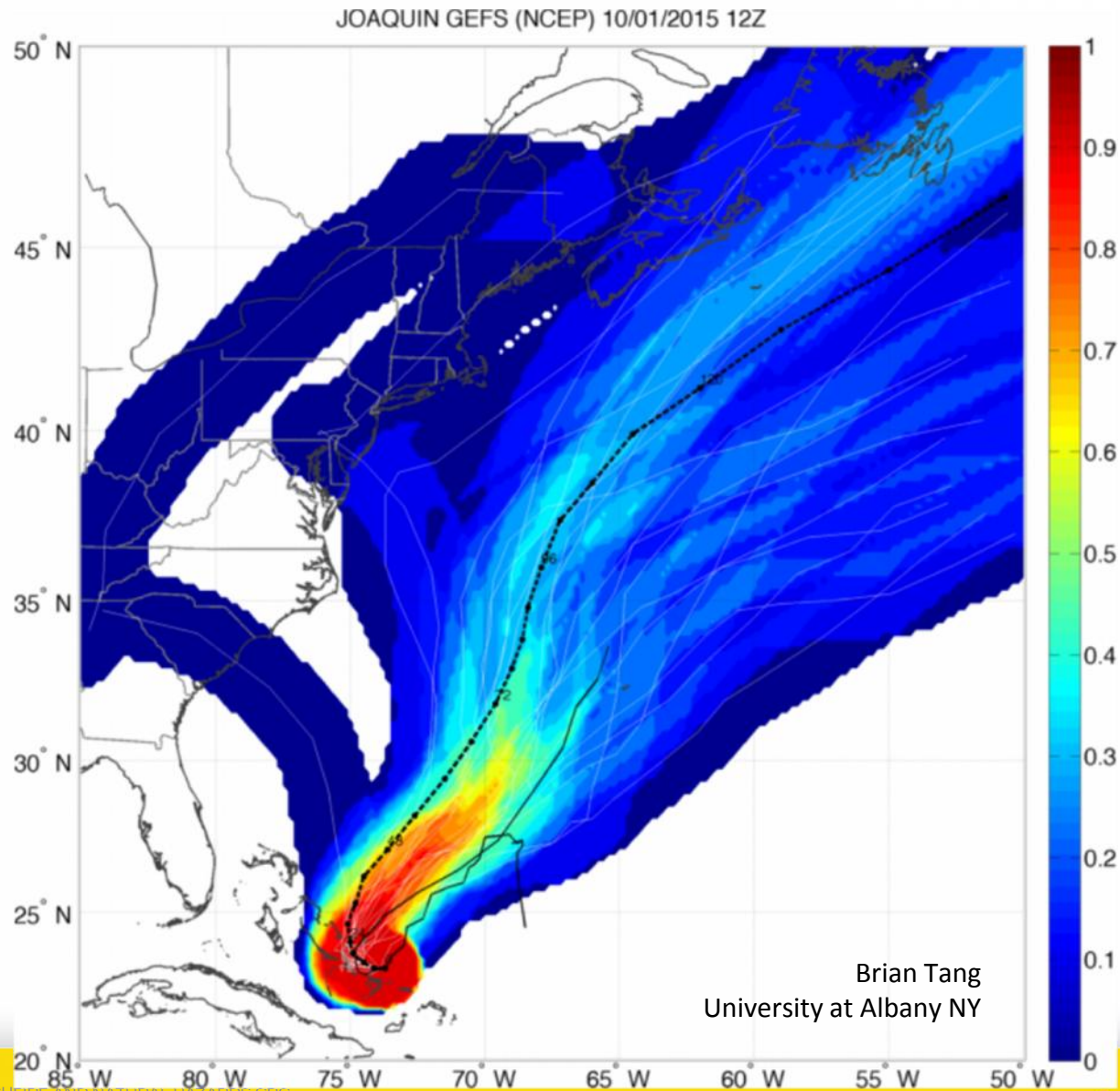FDP RUC 27.11.2014 03:00 (T+9)

We can finally use weather prediction models to produce meaningful impact estimates!

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REGIONAL WIND FIELD
NEW BUREAU HIGH-RESOLUTION MODELS

REGIONAL WIND FIELD: DEALING WITH UNCERTAINTY

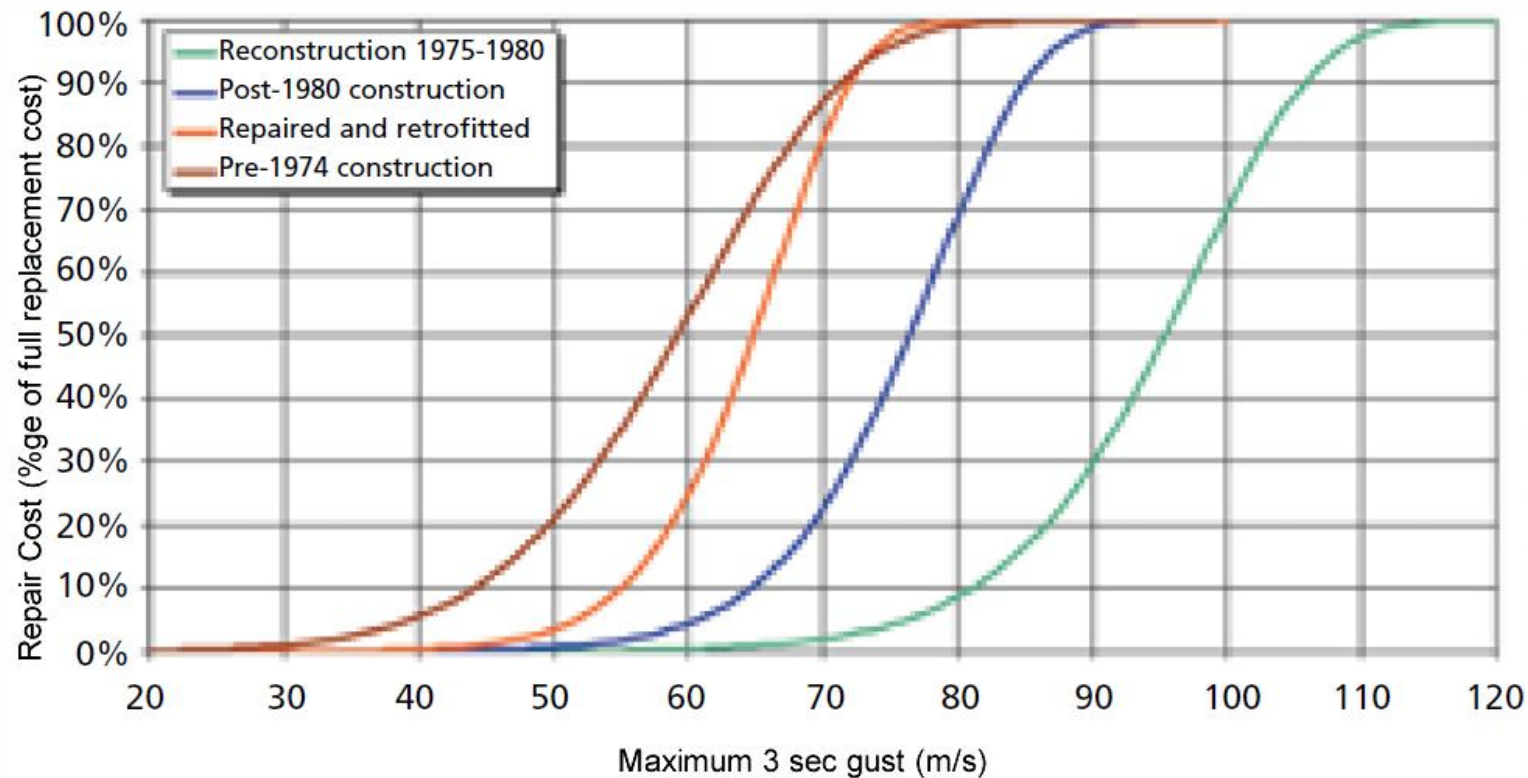JOAQUIN GEFS (NCEP) 10/01/2015 12Z

Brian Tang
University at Albany NY

LOCAL WIND GUSTS

Figure 1: Estimated maximum wind speed from TC Tracy in 1974, incorporating site-specific influences on the wind speed arising due to topography, terrain and existing structures.

Arthur et al. (2008)

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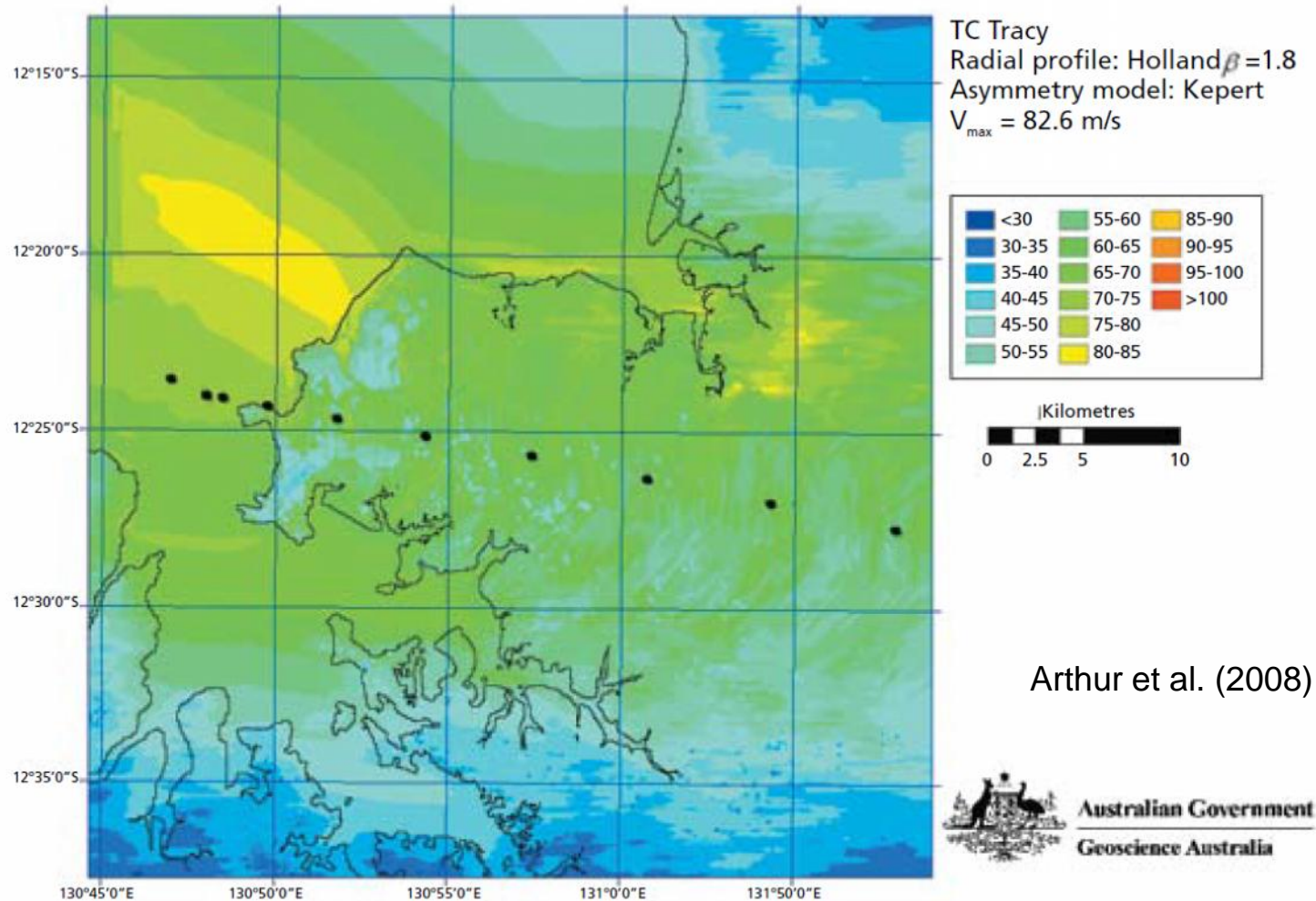
VULNERABILITY ASSESSMENT
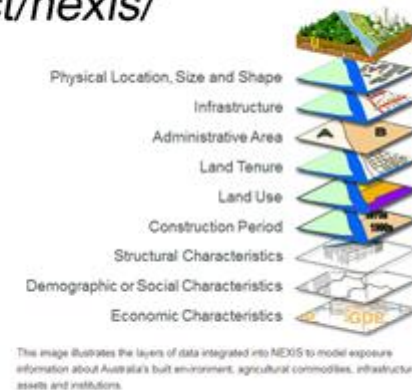# LINKS LOCAL WIND GUSTS TO DAMAGE

Vulnerability of houses varies with age (on average)
- A Tracy peak gust of ~70 m s^{-1} (250 km hr^{-1}) almost destroys a pre-1974 house
- A post-1980 house would only suffer ~25% damage

ASSET TYPES AND LOCATIONS

Asset Specification / Exposure:
http://www.ga.gov.au/scientific-topics/hazards/risk-impact/nexis/

Geoscience Australia has compiled a database
of assets at risk around Australia:
NEXIS = National EXposure Information System

Physical Location, Size and Shape
Infrastructure
Administrative Area
Land Tenure
Land Use
Construction Period
Structural Characteristics
Demographic or Social Characteristics
Economic Characteristics

This image illustrates the layers of data integrated into NEXIS to model exposure information about Australia's built environment, agricultural commodities, infrastructure assets and institutions.

DAMAGE ESTIMATE

1974 residential building stock loss
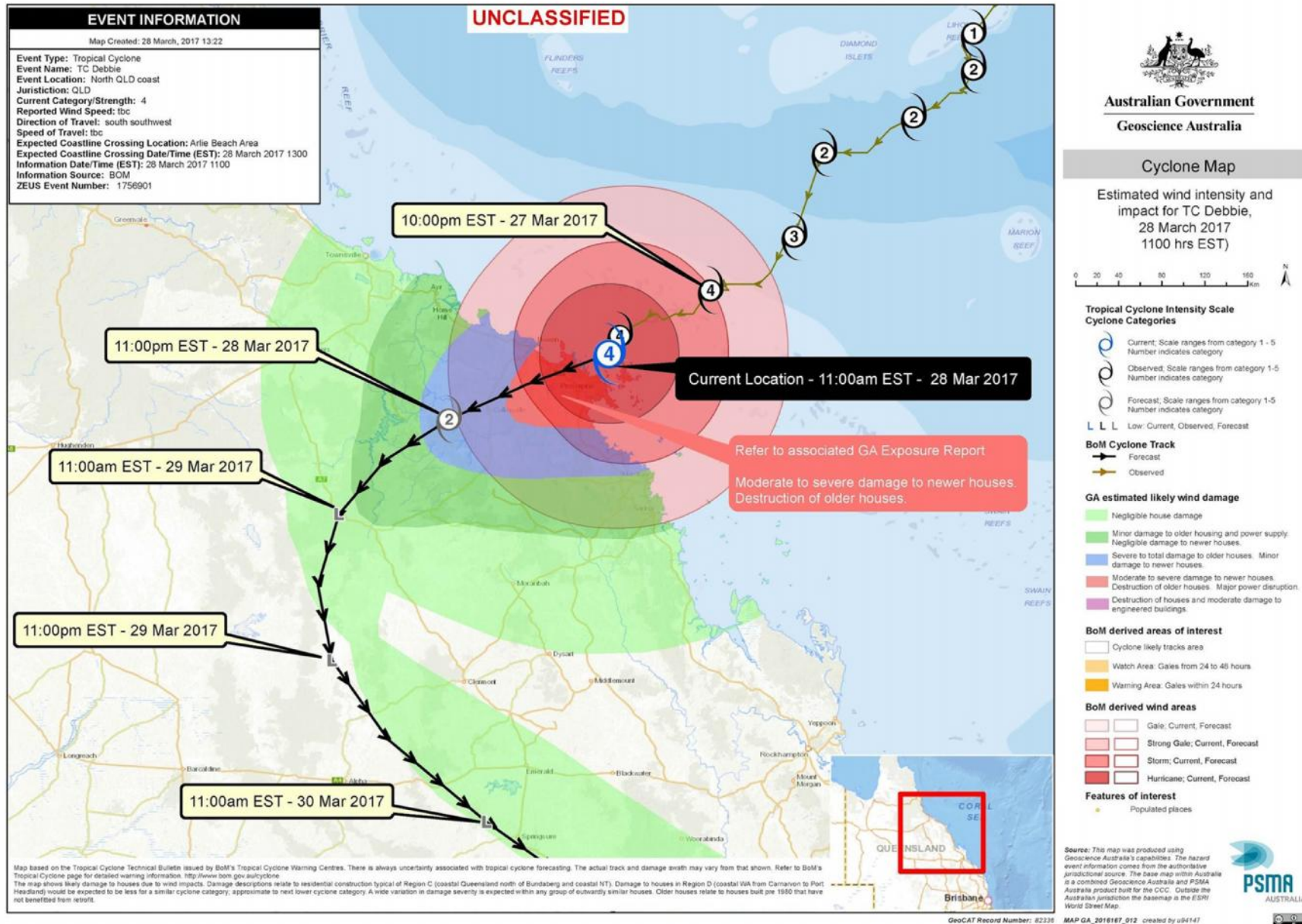
SMOOTHER VERSION OF DAMAGE (TC DEBBIE)

PROJECT METHODOLOGY

1) Initial focus on wind and heavy rain hazard produced by the April 2015 East Coast Low

2) Collecting datasets to derive relationships between winds/rain and damage

3) Assets: focus on residential housing

4) Produce spatial damage information

5) Trial workflow implementation and test with a range of users