

A typology of compound events

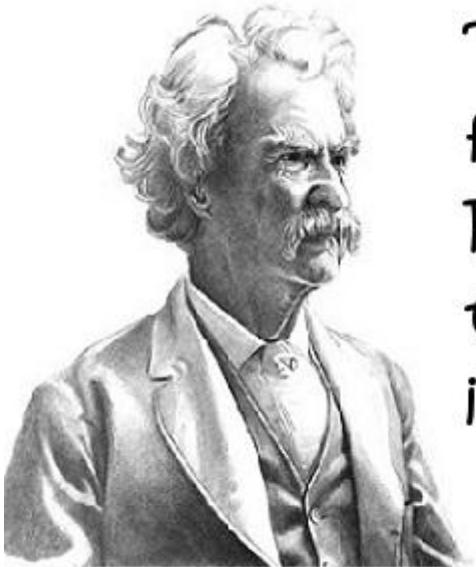
Project Proposal

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Reductionism is central to the scientific process, but our practice of it has gaps.

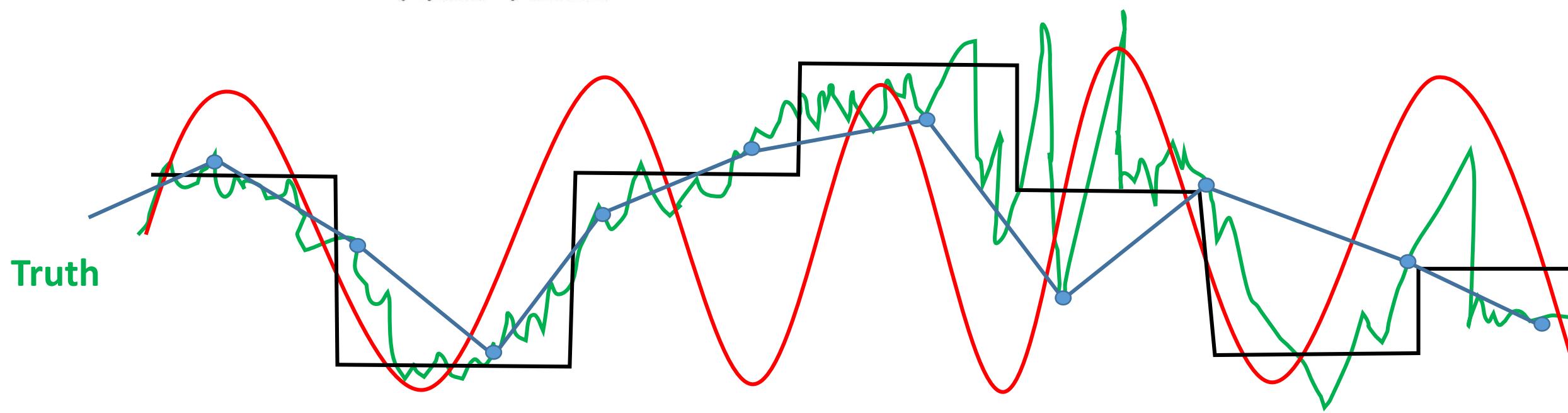
'Complicated phenomena, in which several causes concurring, opposing, or quite independent of each other, operate at once, so as to produce a compound effect, may be simplified by subducting the effect of all the known causes, as well as the nature of the case permits, either by deductive reasoning or by appeal to experience, and thus leaving, as it were, a *residual phenomenon* to be explained. It is by this process, in fact, that science, in its present advanced state, is chiefly promoted.'

JOHN F. W. HERSCHEL (1830). *A Preliminary Discourse on the Study of Natural Philosophy*



Truth is stranger than
fiction, but it is because
Fiction is obliged to stick
to possibilities; Truth
isn't.

Mark Twain



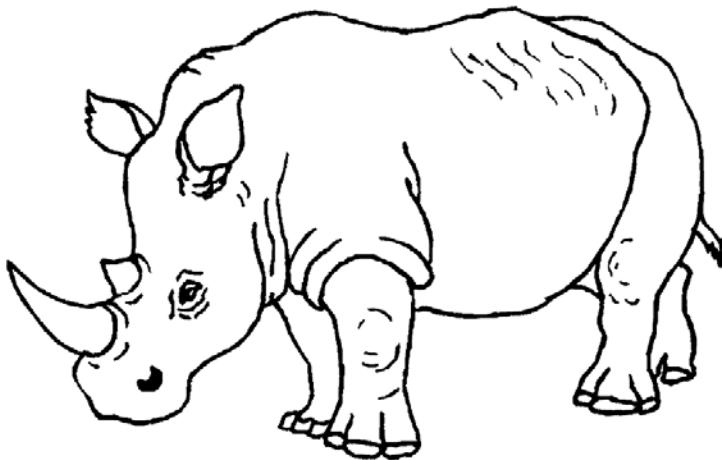
Hazardous events that lead to failure often lie outside the scope of ‘typical’ events.



We need to better account for diversity in our scenarios of extreme events.



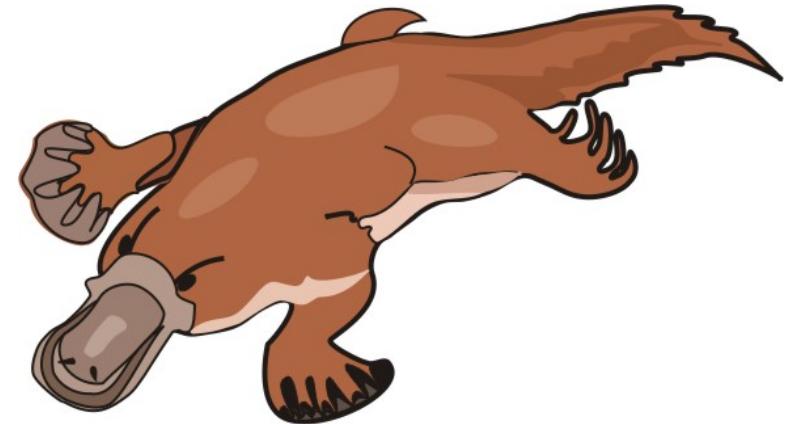
At present, compound events have a problem when defining their scope.



How do we avoid irrelevant events



How do we avoid mythical
“everything” events



How do we avoid “platypus” events



How do we avoid saying every event
is compound

Objective: to develop a framework for identifying compound events for use in planning

Tasks:

1. Develop the typology (document, understand)
 - 1A. Identify modelling capabilities and challenges for all types
 - 1B. Identify historical case studies relating to each type
2. Develop the methodology (simulate)
 - 2A. For select types, identify issues of dependence analysis
 - 2B. For select types, identify issues of simulation

The typology will help define:

- The scope of the stakeholder impact, the impact timescale and spatial scale
- The principal types of variables
- The relevant atmospheric conditions
- The degree of temporal and spatial dependence of the hazard
- The degree of dependence across different types of variables

The methodology will identify compound event scenarios

- Dependence analysis is applied to generating mechanisms based on numerical model output and/or observed data
- Stochastic events are generated (similar to Monte Carlo methodologies)
- Event composition analysis will identify footprint and relevance of compound event scenarios

This project will involve:

- Development of a draft typology for input to GEWEX workshop in April
- A workshop post-April to identify Australian case studies and scope of methodology
- Implementation of methodology for select case studies
- Development of a paper on method and case studies

Project outcomes:

- A typology of compound events and documented status of types (co-authored with GEWEX contributors)
- A documented set of Australian case studies
- A demonstrated method and corresponding paper
- Articulated gaps and recommendations for each event type

Thank you. Comments? Questions?

