The Witness King Tides Project: The Problems Thereof

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Witness King Tides

A Snapshot of Future Sea Levels: Photographing the King Tide

12 January 2009

Department of Environment, Climate Change and Water
Witness King Tides

A Snapshot of Future Sea Levels: Photographing the King Tide

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Communities around the world are joining the King Tides Project.
We are an international network bringing awareness to climate change and the impact of sea level rise.

About the Project

King Tides Project International is an initiative delivered by a network of organizers on coastlines around the world. We are citizen scientists, capturing data and images showing what the future sea levels will be and what is at risk.

The King Tides Project helps people all over the world understand how sea level rise will impact their lives.

Participate

http://kingtides.net
Witness King Tides

Projects in:
- Australia
- Canada
- Mauritius
- New Zealand
- Tuvalu
- USA
Witness King Tides – a Schematic
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The diagram illustrates the prediction and observation of King Tides over a period of 14 days. The graph shows the height (in meters) plotted against time (in days). The green line represents the prediction, while the orange line indicates the observation. The maxima of both prediction and observation are highlighted. The surge line is also shown for comparison.
Witness King Tides – a Schematic

![Graph of Height (m) vs Time (days)]

- **Prediction**
- **Max. prediction**
- **Surge**
- **Observation**
- **Max. observation**

The graph shows oscillations in height (m) over time (days), with marked maxima at specific points.
Witness King Tides – a Schematic

The diagram shows a schematic representation of king tides. It includes:
- **Prediction** line
- **Max. prediction** line
- **Surge** line
- **Observation** line
- **Max. observation** line

The graph plots **Height (m)** against **Time (days)**. Key points marked on the graph represent:
- **Max. observation**
- **Max. prediction**

The graph illustrates the fluctuations in height over time, with peaks and troughs indicating the rise and fall of tides.
In the first Witness King Tide project in NSW in 2009, the observed maximum tide was 90 mm lower than the predicted tide (roughly the global-average sea-level rise since 1970).
GESLA
Global Extreme Sea Level Analysis
Version 2

(Click on above map for summary of data from individual site)
High resolution (≤1 hour) tide-gauge data

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- High resolution (≤1 hour) tide-gauge data
- 39,147 stations–years from 1,353 stations

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GESLA
Global Extreme Sea Level Analysis
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- High resolution (≤1 hour) tide-gauge data
- 39,147 stations-years from 1,353 stations
- Analysis to be described used 586 records
  ≥ 20 years long

(Click on above map for summary of data from individual site)
Select a location, and for each year that is at least 80% complete (the "target year"): 
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- Do tidal analysis of two years of data centred on the target year
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- Do tidal analysis of two years of data centred on the target year

- Extract, from the target year, "days" defined by 80% of the time between sunrise and sunset i.e. "when you can take a photo"
Select a location, and for each year that is at least 80% complete (the "target year"):

- Do tidal analysis of two years of data centred on the target year
- Extract, from the target year, "days" defined by 80% of the time between sunrise and sunset i.e. "when you can take a photo"
- Find "day" and height of highest predicted tide
Select a location, and for each year that is at least 80% complete (the "target year"):

- Do tidal analysis of two years of data centred on the target year
- Extract, from the target year, "days" defined by 80% of the time between sunrise and sunset i.e. "when you can take a photo"
- Find "day" and height of highest predicted tide
- Find highest observed sea level for each "day"
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- Do tidal analysis of two years of data centred on the target year
- Extract, from the target year, "days" defined by 80% of the time between sunrise and sunset i.e. "when you can take a photo"
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Do above for each available year and for each available location
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- Do tidal analysis of two years of data centred on the target year
- Extract, from the target year, "days" defined by 80% of the time between sunrise and sunset i.e. "when you can take a photo"
- Find "day" and height of highest predicted tide
- Find highest observed sea level for each "day"

Do above for each available year and for each available location

Following results are averages over all years at each location
Witness King Tides – Primary Metric

Height of highest of all observed sea levels above observed maximum on day of highest predicted tide
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Data from GESLA-2 (gesla.org)
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Witness King Tides – Primary Metric

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Data from GESLA-2 (gesla.org)
Lessons

Height of highest of all observed sea levels above observed maximum on day of highest predicted tide

Data from GESLA−2 (gesla.org)
Lessons

Some places are good and some are bad for "Witness King Tides" projects.

Height of highest of all observed sea levels above observed maximum on day of highest predicted tide.

Data from GESLA−2 (gesla.org)
Lessons

- Some places are good and some are bad for "Witness King Tides" projects
- Prior to conducting a "Witness King Tides" project, do an analysis of a long local tide-gauge record

Height of highest of all observed sea levels above observed maximum on day of highest predicted tide

Data from GESLA-2 (gesla.org)
Lessons

- Some places are good and some are bad for "Witness King Tides" projects
- Prior to conducting a "Witness King Tides" project, do an analysis of a long local tide-gauge record
- Consider using continuously-recording cameras instead

Data from GESLA-2 (gesla.org)

Height of highest of all observed sea levels above observed maximum on day of highest predicted tide
Thank You!

Geoff Mackley