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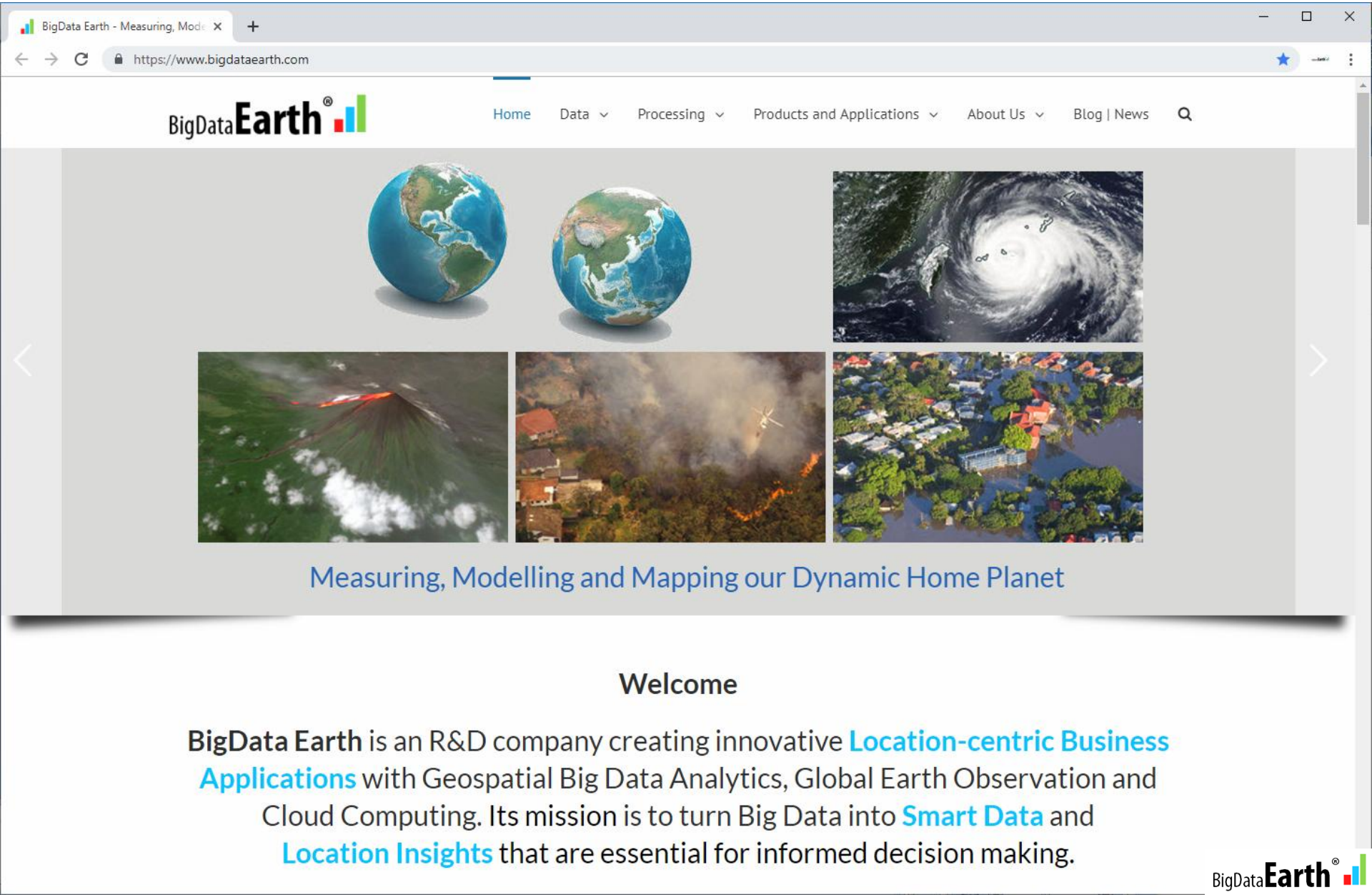
Introducing
New R&D at BigData Earth

www.BigDataEarth.com
Sydney, Australia
08/2019

Website: https://www.BigDataEarth.com/



Blog: https://www.BigDataEarth.com/blog/

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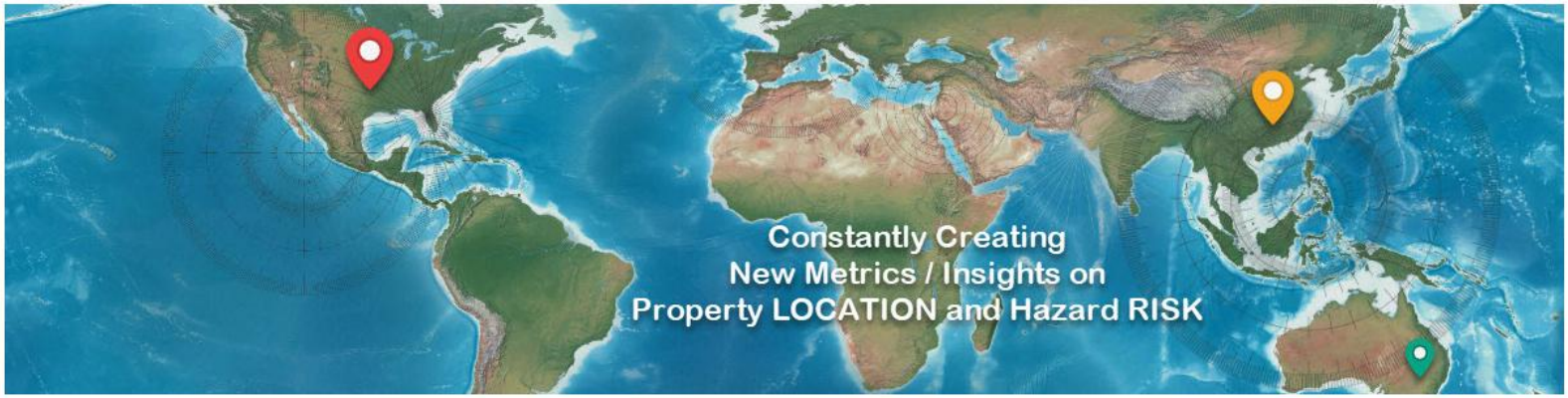

Blog

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18
06, 2019

Applications of New National Contour Web Maps: Part 3 (Identifying Riverine Flood-prone Areas)

June 18th, 2019 | APIs, Apps, Australia, Emergency, Exposure, Flood, Geospatial Big Data Analytics, Insurance, Location Intelligence, Property Information, Risk

18 June 2019 We keep showcasing the potential application of new high-resolution contour web maps for Australia that have been recently developed (link). Previous blogs in this series include: Applications of New National Contour Web Maps: Part 2 (Identifying Low-lying Coastal Areas) - link Applications of New National Contour Web Maps: [...]

Search ...

Recent Posts

- Applications of New National Contour Web Maps: Part 3 (Identifying Riverine Flood-prone Areas)
- Applications of New National Contour Web Maps: Part 2 (Identifying Low-lying Coastal Areas)
- Applications of New National Contour Web Maps: Part 1 (Enhancing High-resolution Imagery Mapping)

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New R&D at BigData Earth

Main Applications: Property location information, emergency & insurance, the news media, etc.
Coverage: Australia, the U.S., China, etc.

- Building cloud-based big data and analytics platforms
- Developing web mapping, analysis and reporting Apps
- Creating address-level property location profile reports
- Developing unique hazard and exposure investigation tools
- Creating new software for Earth observation image processing
- Developing a suite of timely information products from Earth observation imagery to reports to animations in response to major events
- Delivering products via web APIs and web services

Location Profile APIs on Property Location & Hazard Risk Intelligence

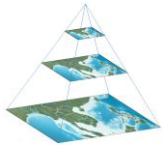
Emergency & Insurance: New Web Mapping, Analysis and Reporting App on Exposure Management

The Use of Geospatial Web Services & Web Maps to Advance Flood Risk Analytics in Australia

Advancing Bushfire Risk Analytics with Location Profile APIs and Web Services – 4 New Info Products

Advancing Flood Risk Analytics with Location Profile APIs and Web Services – 3 New Info Products

Advancing Cyclone Risk Analytics with Location Profile APIs and Web Services – 3 New Info Products



Major Products & Solutions

Two cloud-based big data & analytics platforms on property location & hazard risk information

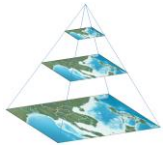
- **Australia** https://www.PropertyLocation.com.au/ (or www.RiskMapping.com.au)
- **International** https://www.PropertyLocation360.com/ (or www.GeoRisk360.com)

Web APIs on Location Profile & Hazard Risk Analytics

- Developer Portal: https://Developer.BigDataEarth.com

Web App on Exposure Management

Web Maps on Terrain & Hydrology



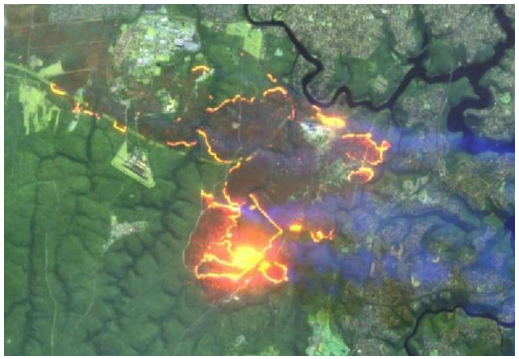
New Cloud-based Products Available

- **Web APIs on Location Profile & Hazard Risk Analytics**
  - General Location Profile APIs
  - Bushfire Risk Analytics
  - Flood Risk Analytics
  - Tropical Cyclone Risk Analytics
  - Exposure Analytics
- **Web App on Exposure Management**
  - Mapping
  - Analysis (at both portfolio- and site-level)
  - Reporting
- **Web Maps on Terrain & Hydrology**
  - High-resolution Elevation Contours
  - Modelled Surface Water Flow Directions
  - Shaded Relief Maps

1. Web APIs on Location Profile & Hazard Risk Analytics

Developed an integrated set of **location metrics** on property location, hazard risk & the environment, providing **measured contextual insights**.

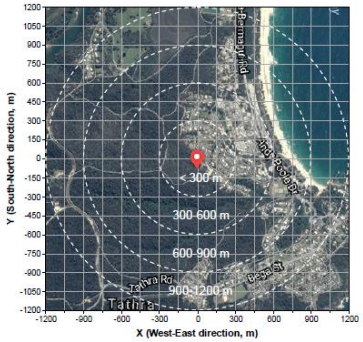
Advancing Site-level Bushfire Risk Analytics with Web APIs



Distance Ranges from Nearby Bushland <100m

Shortest distance from address to bushland: 120m
Address: x Galston Rd, Hornsby NSW 2077, Australia

Surrounding Bushland



The distance from this address to nearby large bushland is less than 100 m; bushfires occasionally take place in nearby bushland during the hot summer.

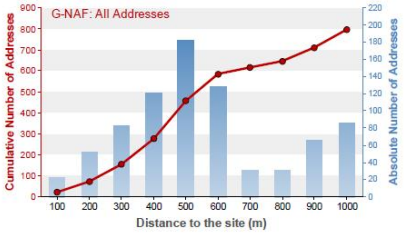
The percentage of bushland cover at various distance ranges from the property.

Estimating Exposure at Risk from Multiple Perspectives

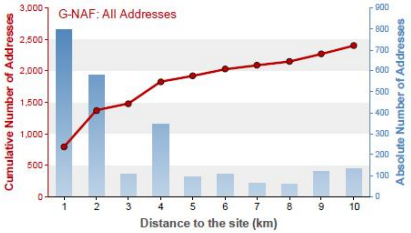
(Analysis based on 02/2018 Geocoded National Address File)

A1: All Addresses, All Directions

1km



10km



Distance (m)	100	200	300	400	500	600	700	800	900	1000
Absolute #	22	51	82	121	181	128	31	30	65	85
Cumulative #	22	73	155	276	457	585	616	646	711	796

Distance (km)	1	2	3	4	5	6	7	8	9	10
Absolute #	796	578	107	346	92	104	64	59	120	132
Cumulative #	796	1,374	1,481	1,827	1,919	2,023	2,087	2,146	2,266	2,398

For locations in Australia and the state of California, the US. More info in this blog: https://www.bigdataearth.com/bushfire/advancing-bushfire-risk-analytics-location-profile-apis-showcases/

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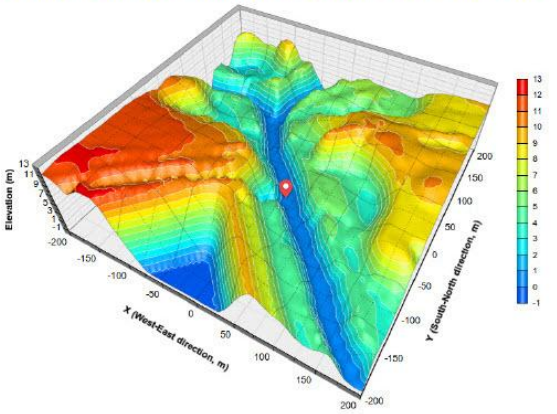
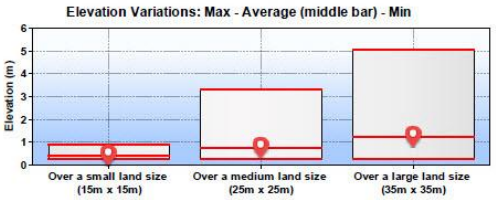
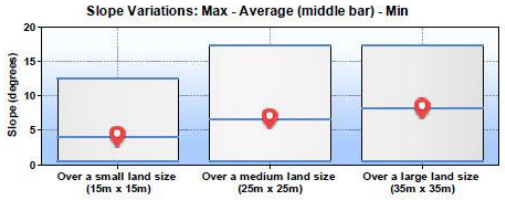
Advancing Site-level Flood Risk Analytics with Web APIs

▶ Terrain: Average Elevation & Slope Over Various Land Sizes







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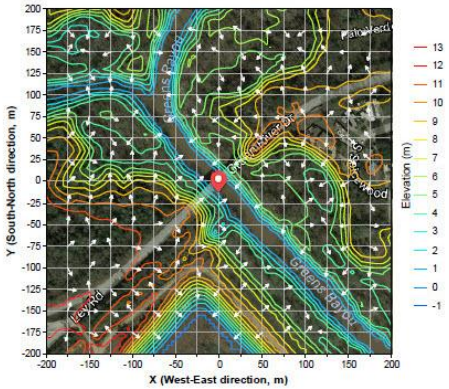
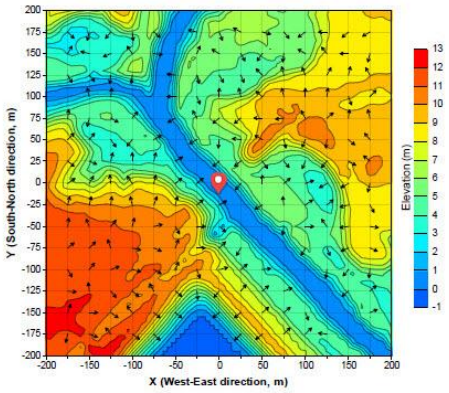
▶ Flood: Surface Water Flow Directions related to Flash, Riverine, or Coastal Flooding





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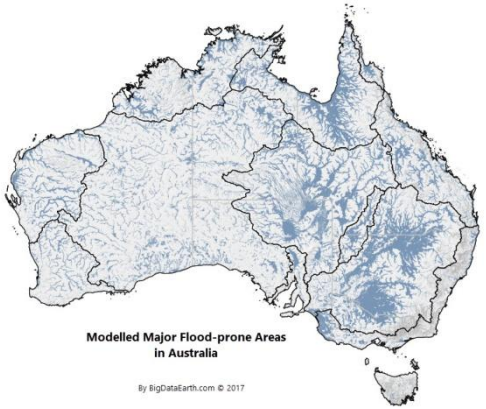

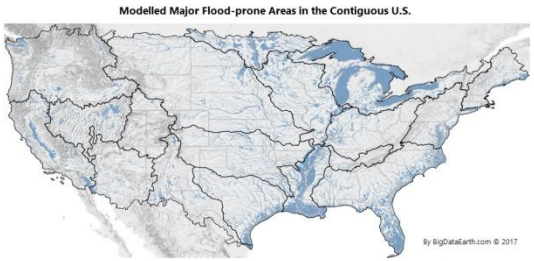

For locations in Australia and the Contiguous US. More information in this blog: https://www.bigdataearth.com/flood/advancing-flood-risk-analytics-location-profile-apis-showcases/

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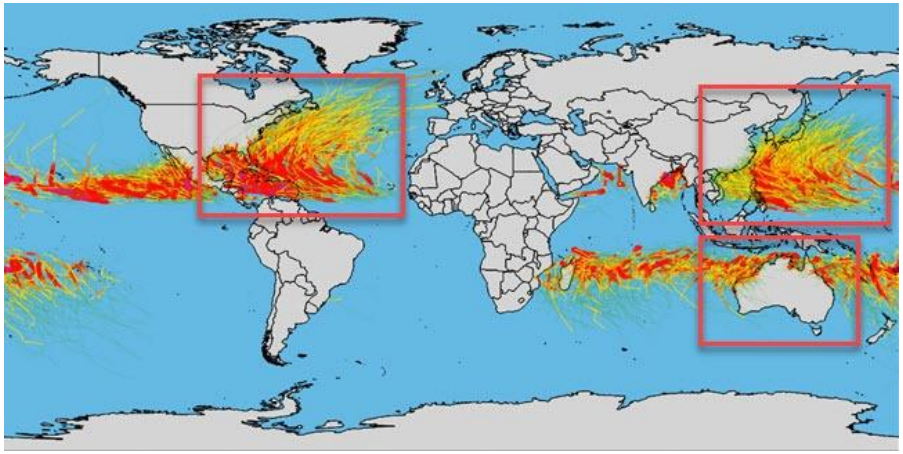
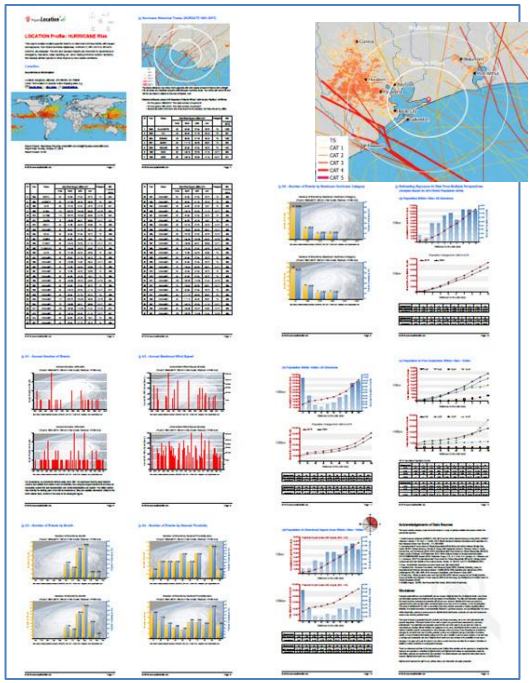
Advancing Tropical Cyclone Risk Analytics with Web APIs





Two publicly-available tropical cyclone databases are analysed:

- The International Best Track Archive for Climate Stewardship (**IBTrACS v03r10**, released September 2017) from the NOAA National Climatic Data Center (NCDC)
- Atlantic hurricane database (**HURDAT2**, 1851-2017) from the NOAA National Hurricane Center (NHC)

Covering Australia, West Pacific & North Atlantic basins. More information in this blog : https://www.bigdataearth.com/hurricane/advancing-tropical-cyclone-risk-analytics-with-location-profile-apis-showcases/

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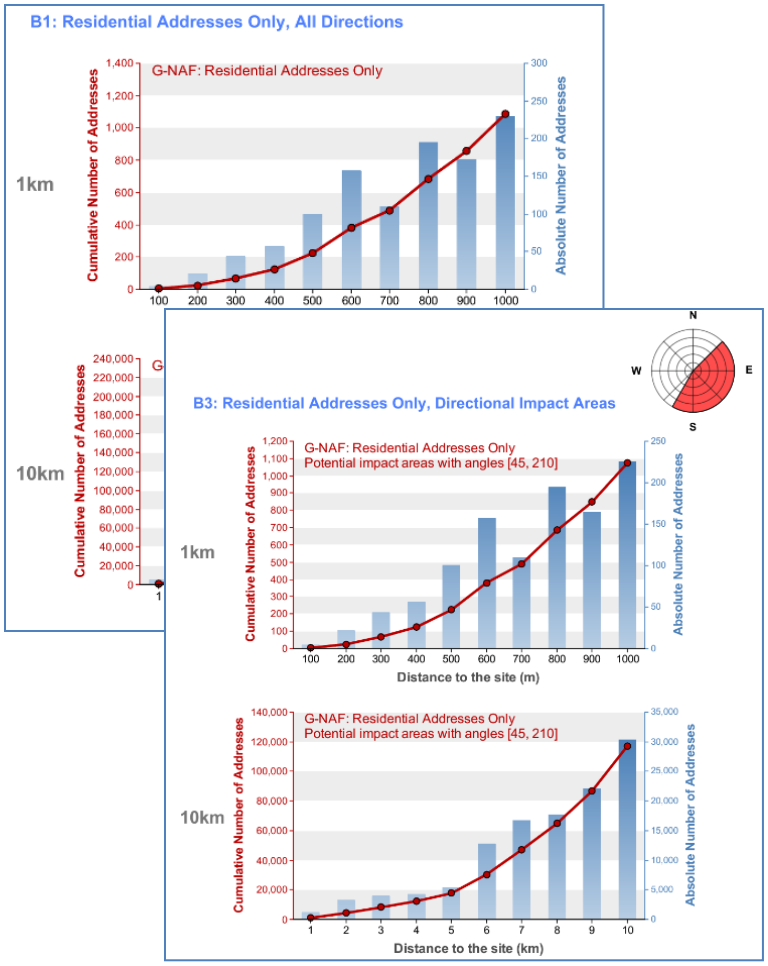
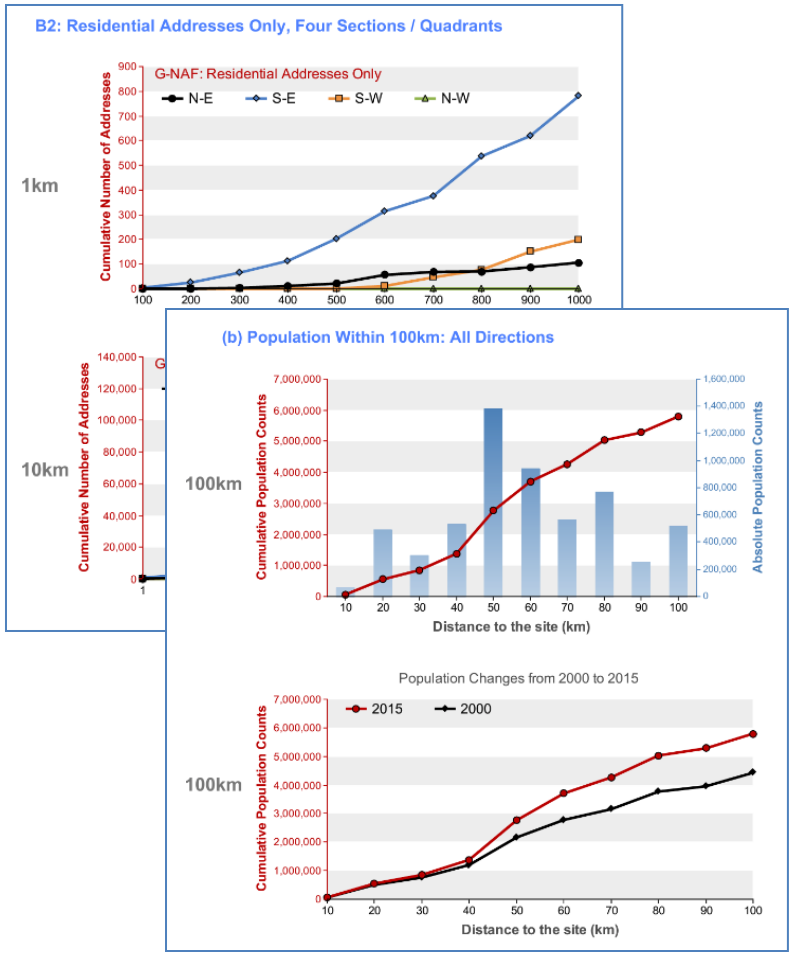
Rapid Exposure Analytics with Web APIs (For any type of exposure data, e.g. population, sum insured)





Four perspectives on spatial and temporal exposure analyses are presented.
More info in this blog:
https://www.bigdataearth.com/exposure/innovative-exposure-analytics/

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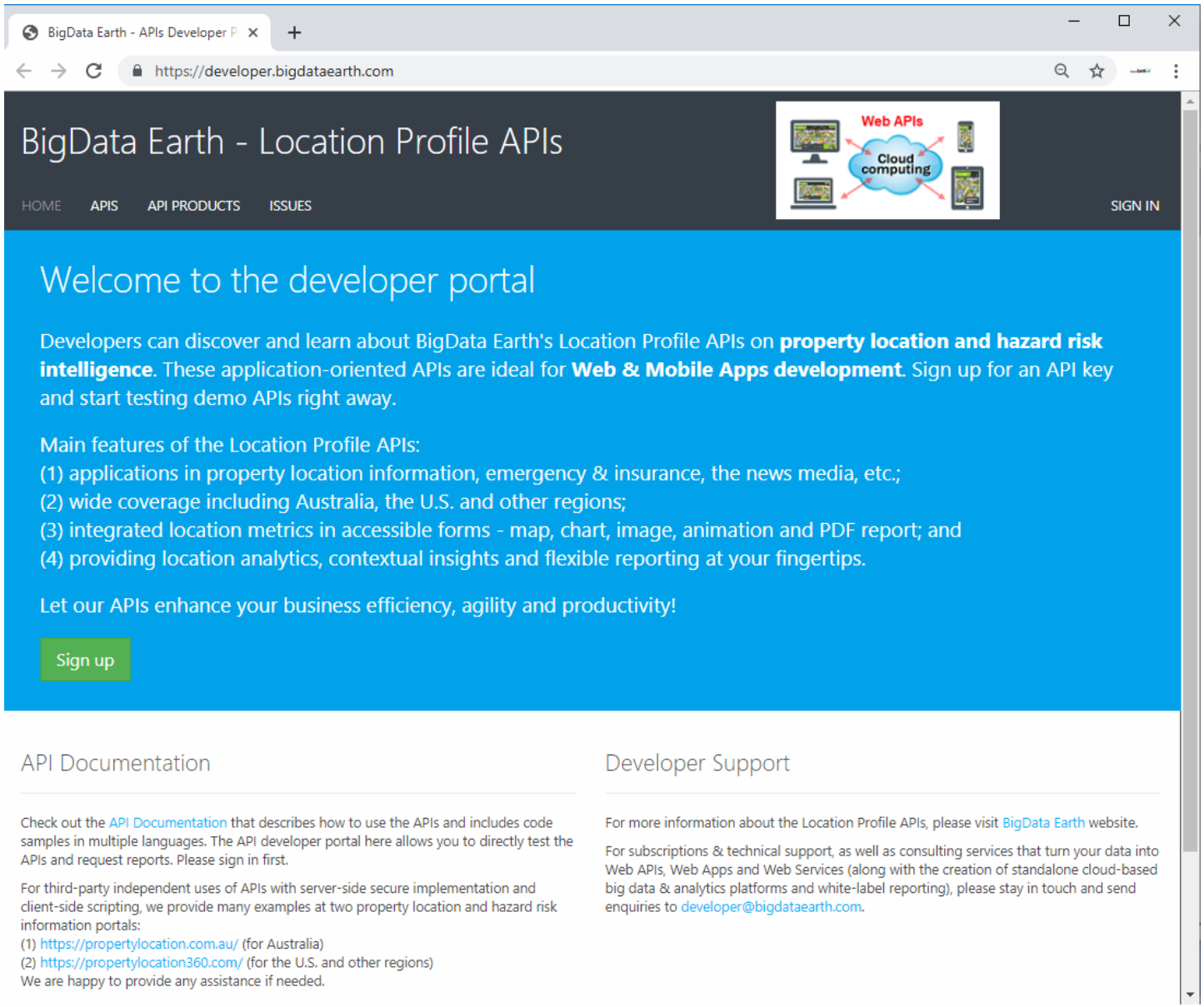
Developer Portal for Location Profile APIs: https://Developer.BigDataEarth.com



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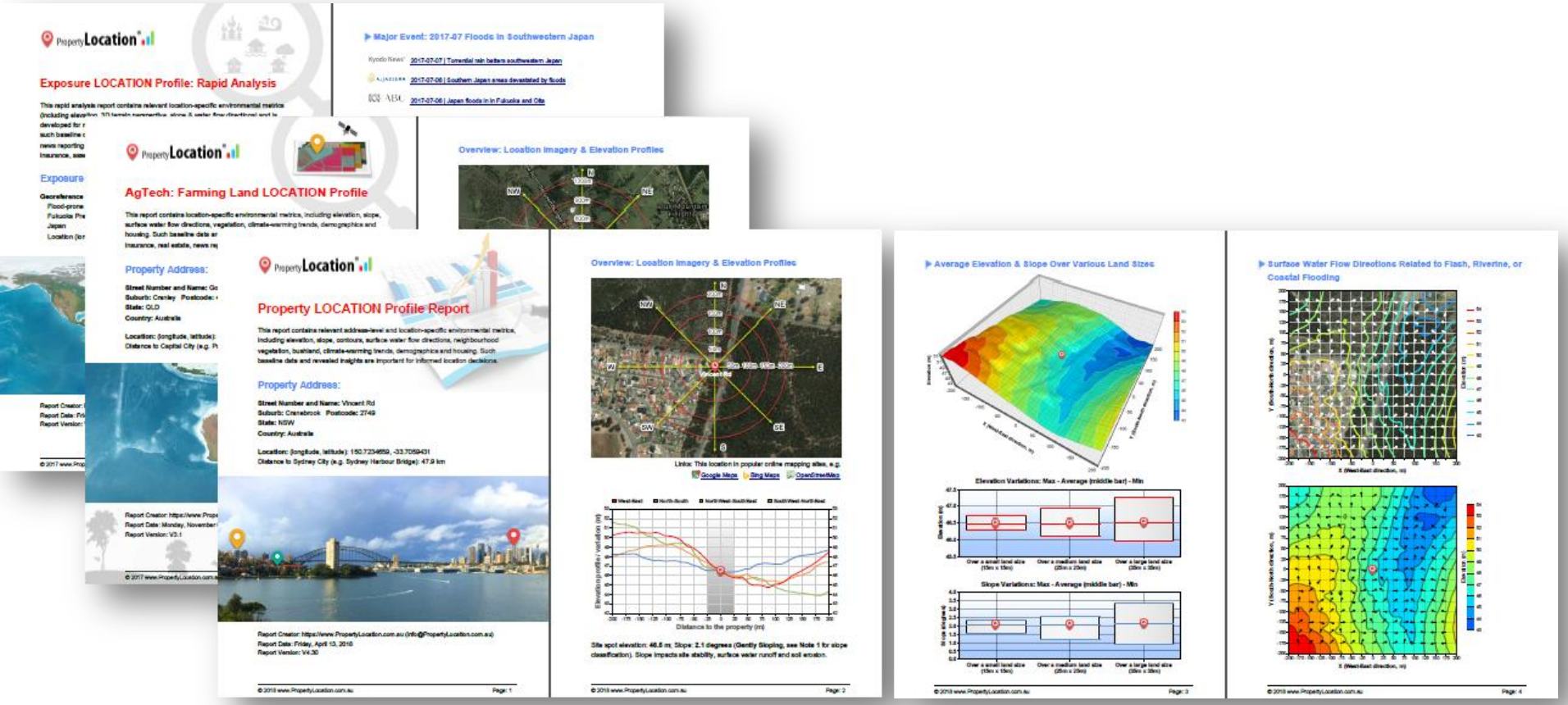
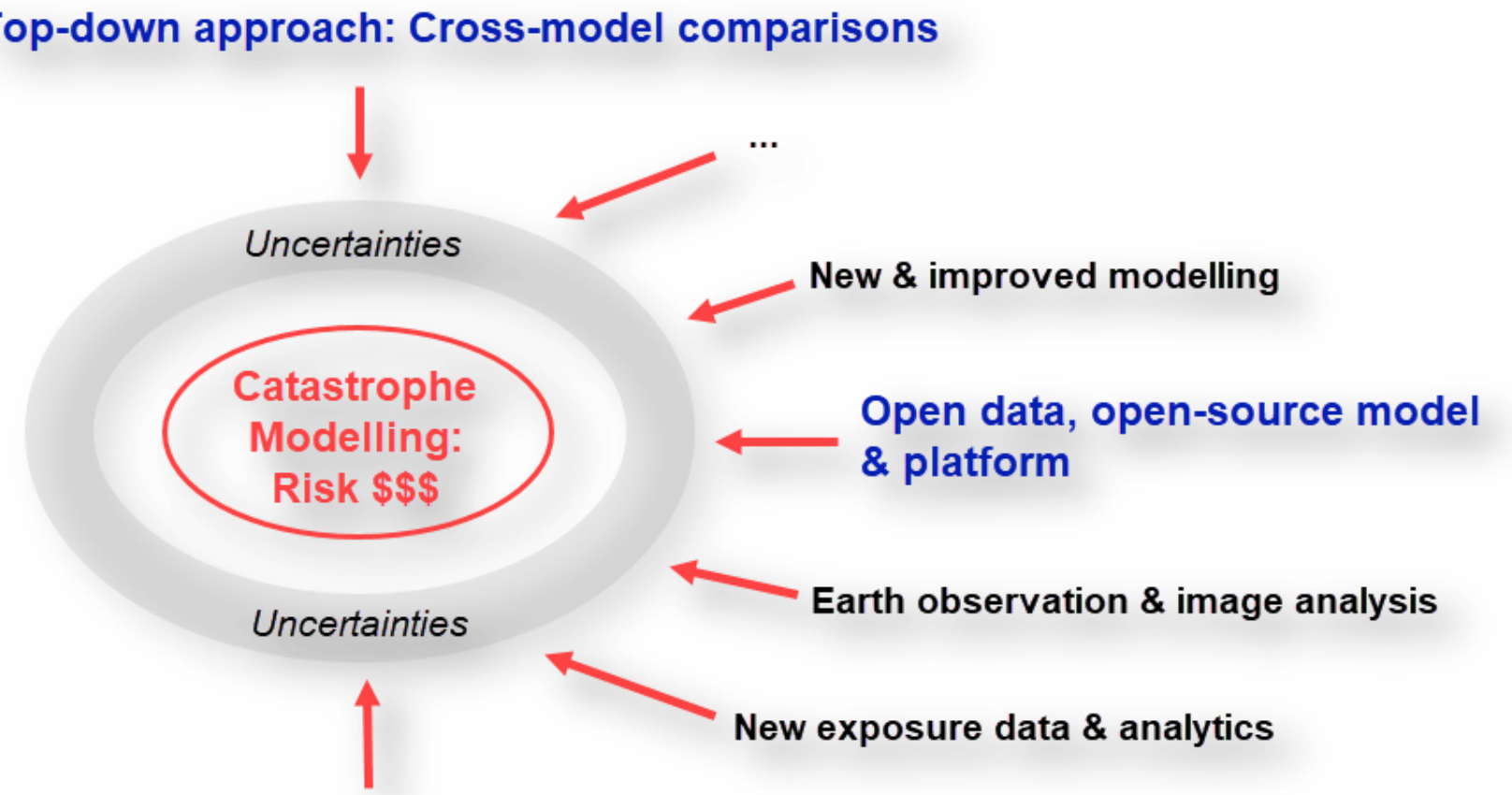
Web APIs on Location Profile & Hazard Risk Analytics: Application 1

Various **Property / Exposure Location Profile Reports** for each location (PDF, up to 40+ pages) can be requested and delivered with simple API calls. Many sample reports are available: Australia, the US and worldwide | demo portal 1 and portal 2



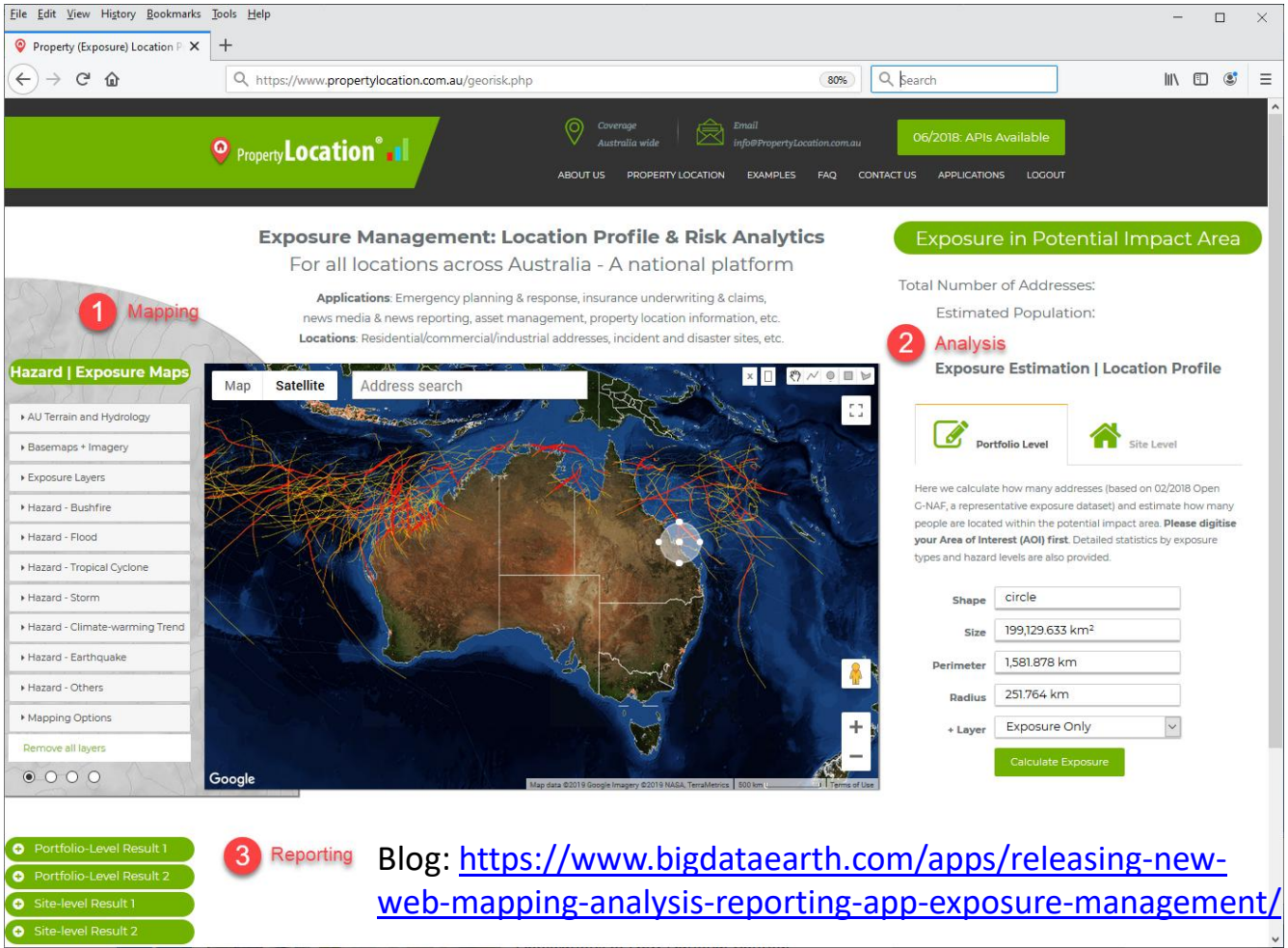
Web APIs on Location Profile & Hazard Risk Analytics: Application 2

A bottom-up approach to reducing uncertainties in catastrophe loss modelling: API-enabled report **revealing underlying data, context & processes**. More info in this blog.



2. Web App on Exposure Management

- Designed for rapid exposure analysis in **emergency** & **insurance**
- A national coverage, with all major perils considered
- Including 3 key functions altogether: **mapping**, **analysis** & **reporting**



Blog: https://www.bigdataearth.com/apps/releasing-new-web-mapping-analysis-reporting-app-exposure-management/

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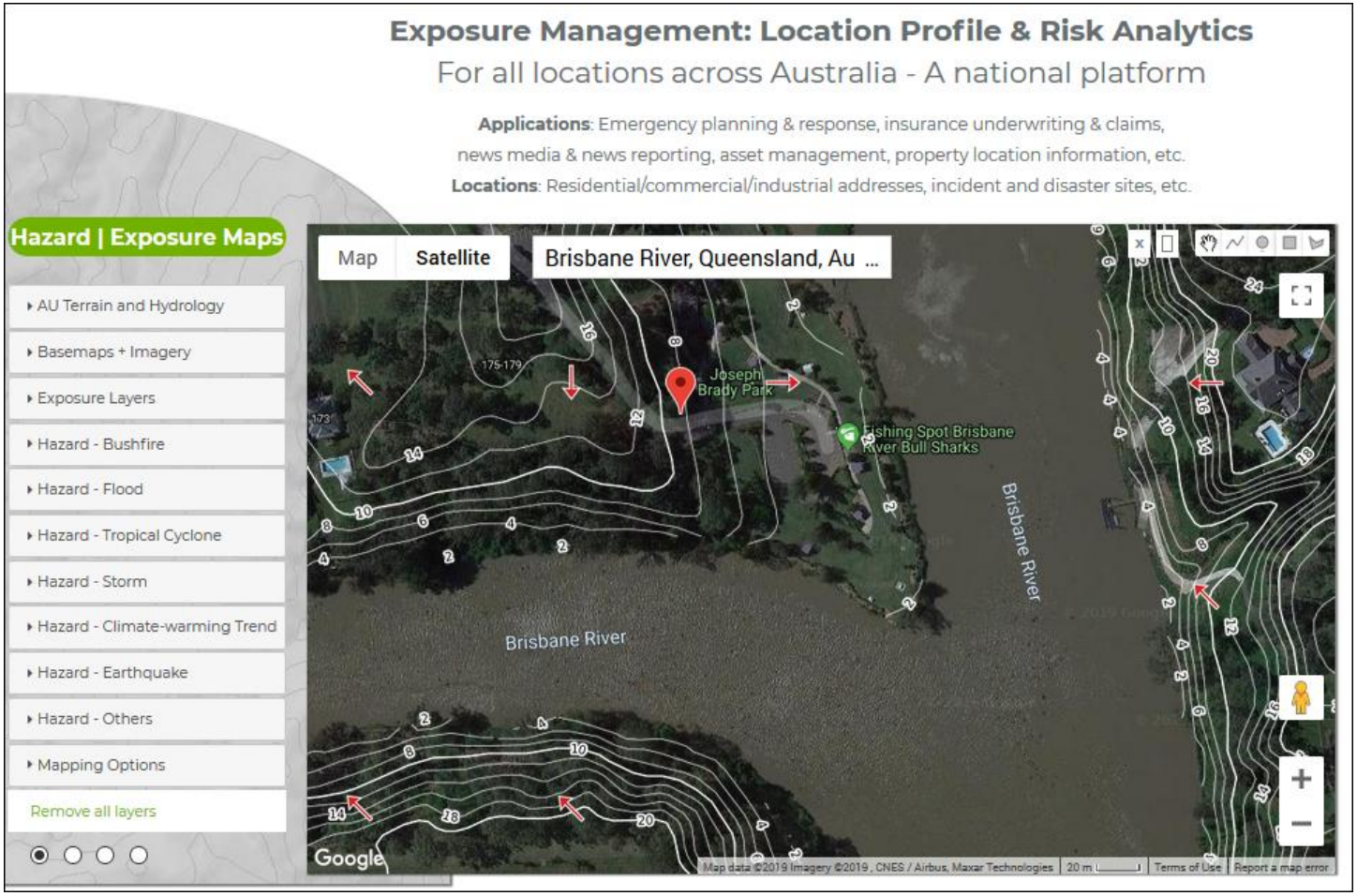
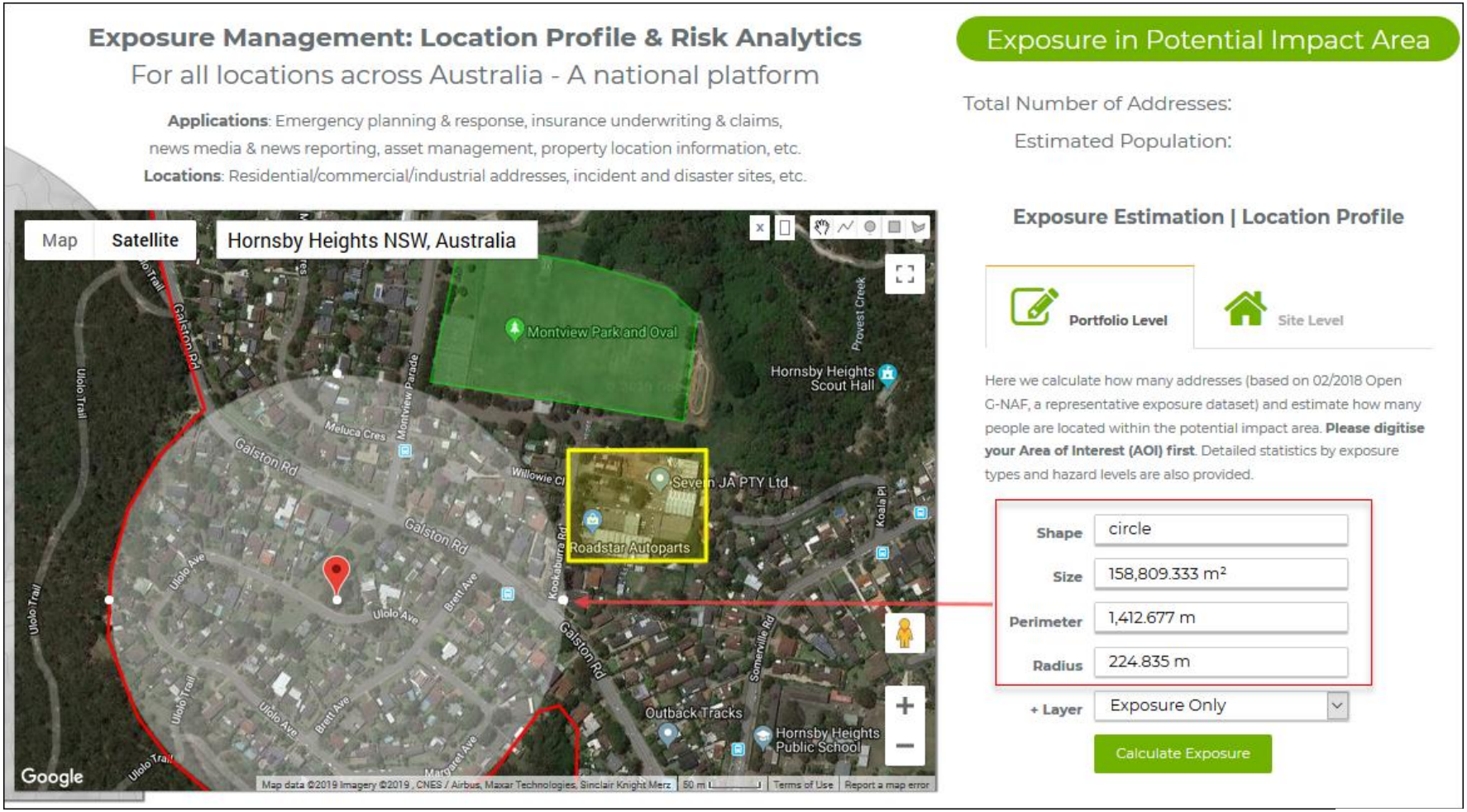
Mapping 1

- Integrating map sources (e.g. in WMS) from GA, BOM, NASA, etc.
- Setting up standalone map servers with GeoServer, PostGIS, etc.
- Creating nationally-consistent tiled web maps (e.g. contours)



Mapping 2

- Containing a full set of **digitising**, **editing** and **measurement** tools
- Creating various shapes (e.g. polygon, rectangle, circle & polyline)



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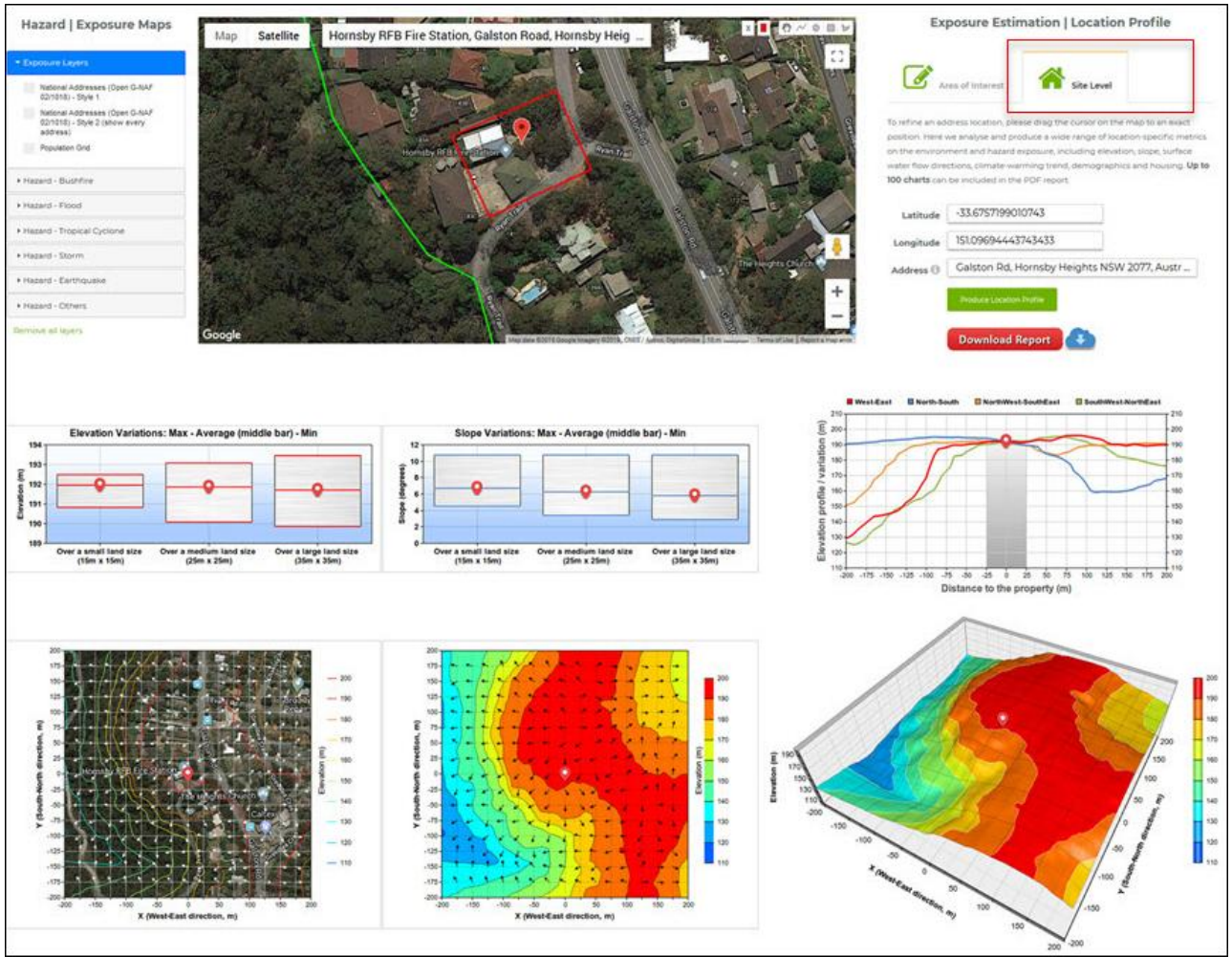
Analysis 1 – Portfolio Level

- Any type of exposure data (e.g. sum insured) can be analysed.
- Example: Rapid exposure estimation for Severe Cyclones Veronica & Trevor on WA & NT coasts, respectively, during March 2019.

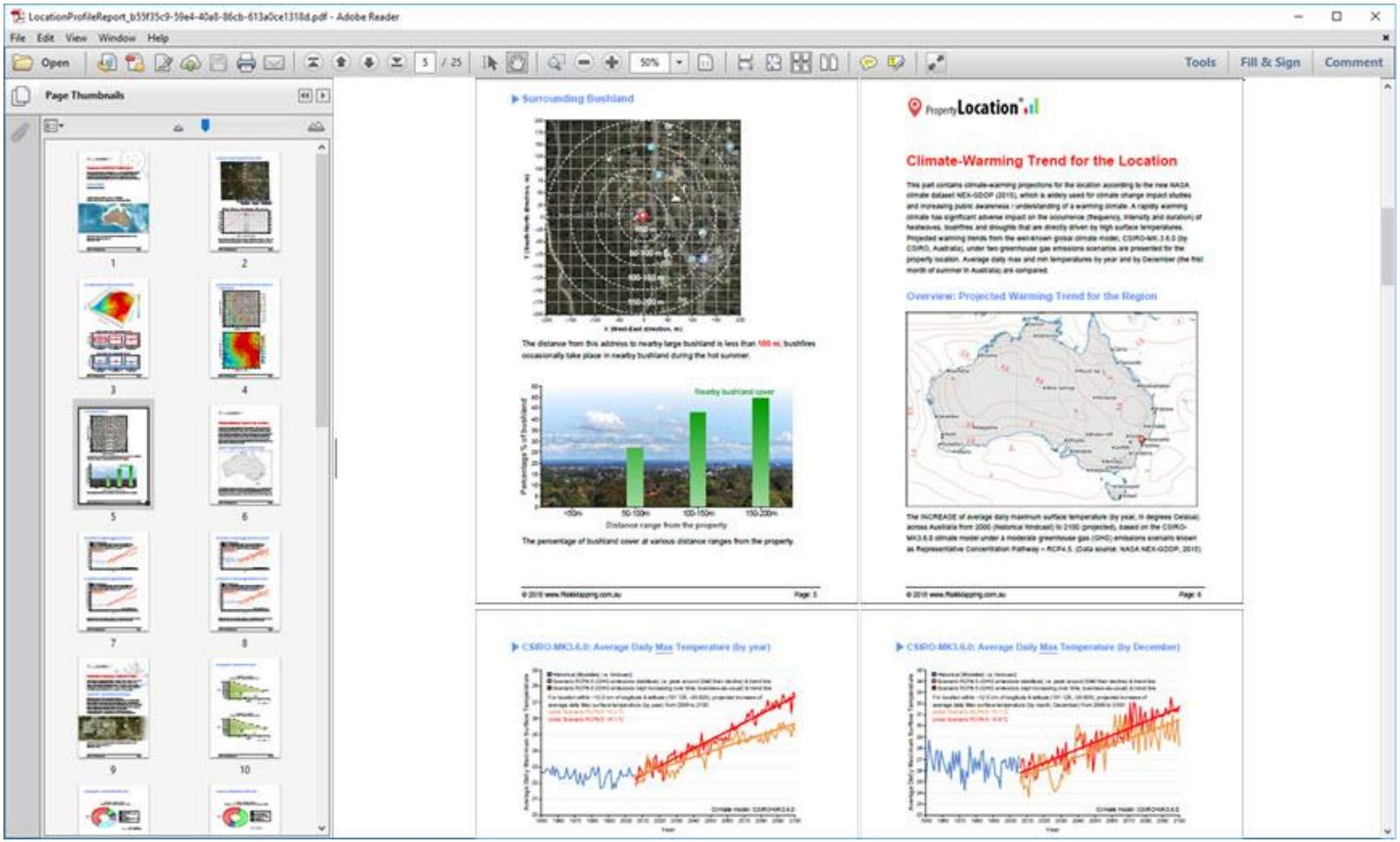
Analysis 2 – Site Level

- Important for location sensitive perils (bushfire, flood, etc.)
- Producing more than 100 location metrics in seconds and making **measured contextual insights** accessible.



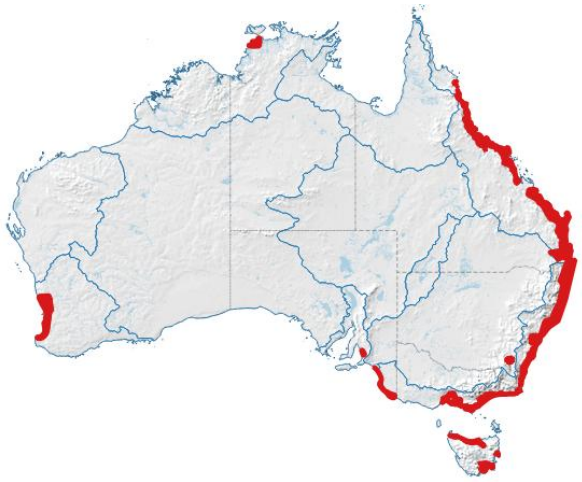
Reporting

- Key maps and metrics instantly shown in Browser (they may be used as data / business intelligence dashboards)
- All analysis results in downloadable PDF report (up to 40+ pages)



3. Web Maps on Terrain & Hydrology

Unique and accessible tiled web maps on **high-resolution contours**, **modelled surface water flow directions** and **shaded relief**.



High-resolution maps cover ~70% populated areas in Australia, including most major flood-prone regions predominantly in the east coast.

Feedback from map reviewer: "*I'll never look at flood maps the same way again…*".

Blog: https://www.bigdataearth.com/flood/two-additional-tools-advance-flood-risk-analytics-scale-australia/

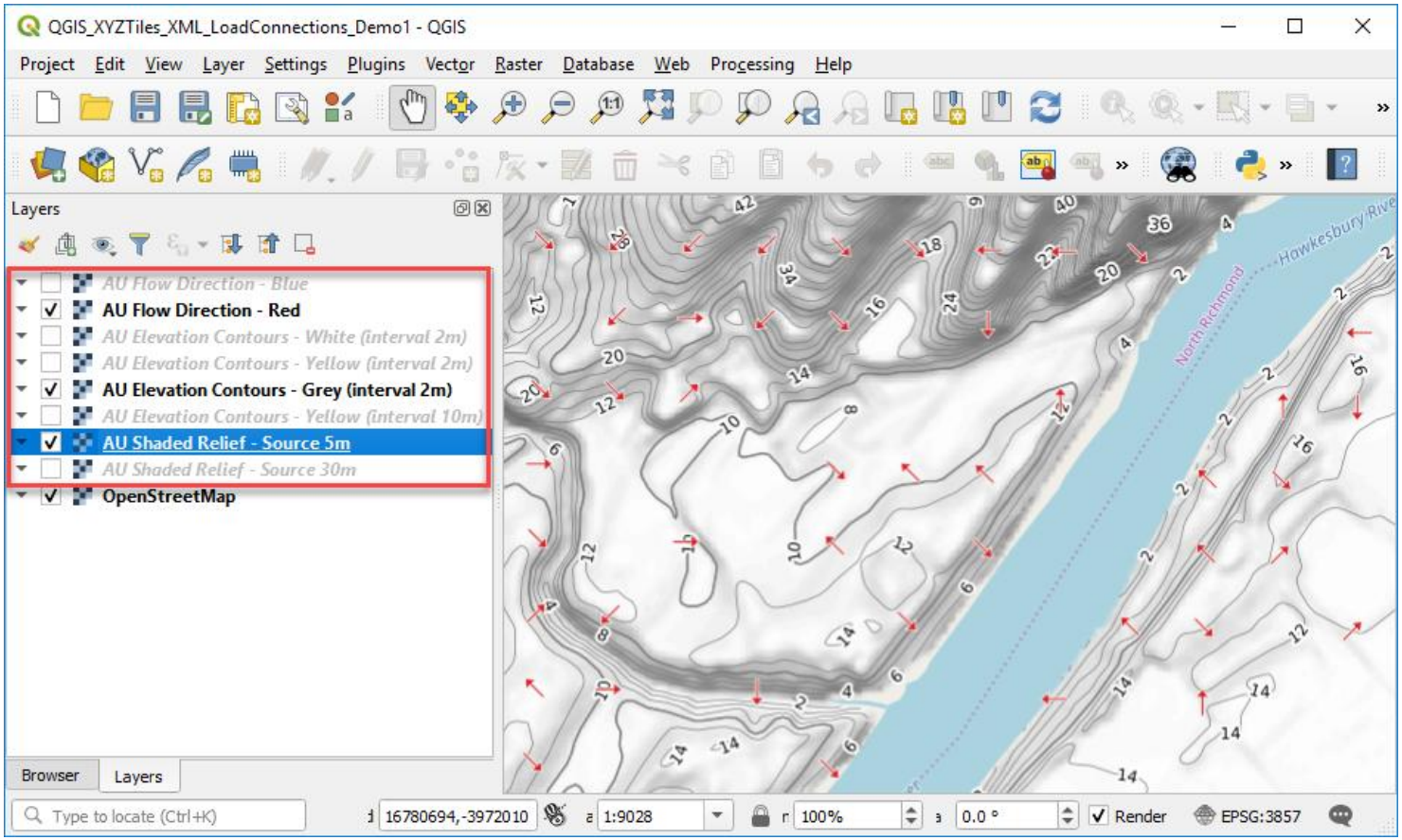
3. Web Maps on Terrain & Hydrology (Cont'd)

- Consistently-styled & scalable (display at multiple zoom levels)
- Easy integration with **web**, **mobile** or **desktop mapping**

XYZ Tiles: BigDataEarth.com; DEM source: Geoscience Australia

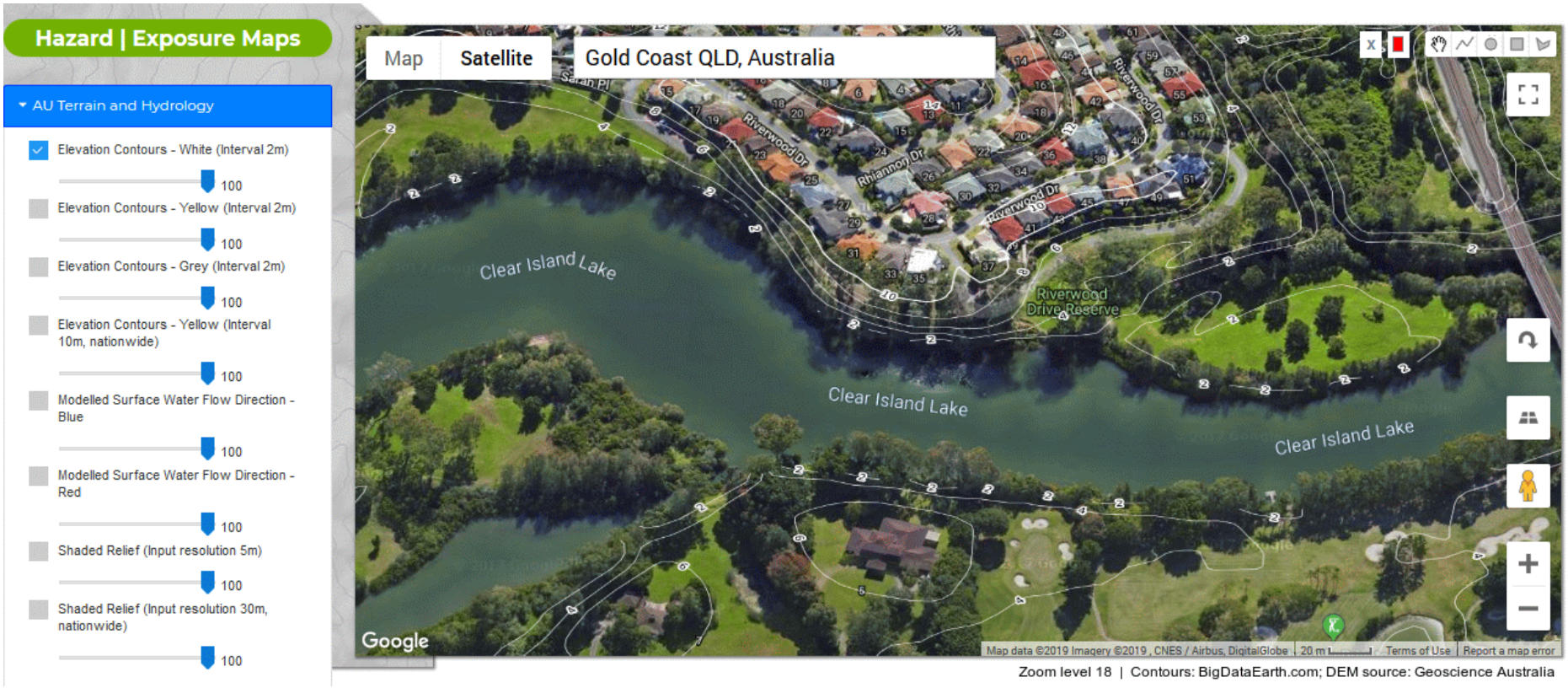
3. Web Maps on Terrain & Hydrology (Cont'd)

- Based on Geoscience Australia's **5m-resolution DTMs**
- Enabled by **modern cloud infrastructure** with multiple web services
- Instant access and rapid delivery via **APIs**



3. Web Maps on Terrain & Hydrology (Cont'd)

Application 1: **Investigating riverine flood-prone areas** before, during and after flooding in a web mapping environment



Blog: https://www.bigdataearth.com/australia/applications-new-national-contour-web-maps-part-3-identifying-riverine-flood-prone-areas/

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3. Web Maps on Terrain & Hydrology (Cont'd)

Application 2: **Identifying low-lying coastal areas** susceptible to storm surges, sea-level rise, erosion and tsunamis.

Blog: https://www.bigdataearth.com/australia/applications-new-national-contour-web-maps-part-2-identifying-low-lying-coastal-areas/

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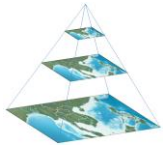

Summary - BigData Earth Products & Solutions Enabled by Geospatial Big Data Analytics & Cloud Computing

Main Application Areas, e.g.	Implementation
1 – Property/Exposure Location Profile Report	Web APIs / Apps / Maps
2 – Bushfire Risk Analytics	Web APIs / Apps / Maps
3 – Flood Risk Analytics	Web APIs / Apps / Maps
4 – Tropical Cyclone Risk Analytics	Web APIs / Apps / Maps
5 – Exposure Analytics	Web APIs / Apps / Maps

- Most R&D is on **property location** and **hazard risk analytics**. Most energy on developing and applying new technologies (**Web APIs**, **Web Apps** & **Web Maps**) to support two cloud-based geospatial big data and analytics platforms, with applications in Australia and overseas.

- New opportunities are created by **geospatial big data analytics** and **cloud computing**. A range of new products have been developed at scale with significant use of **automation** and **optimisation**.

- A transformative journey from **desktop computing** to **cloud computing**! Seeking broad client interests and extending our R&D experience for new & innovative applications.

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