Field surveys of the December 2018 Anak Krakatau tsunami

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International Tsunami Seminar
Monday 20th Nov 2023 at University of Bath

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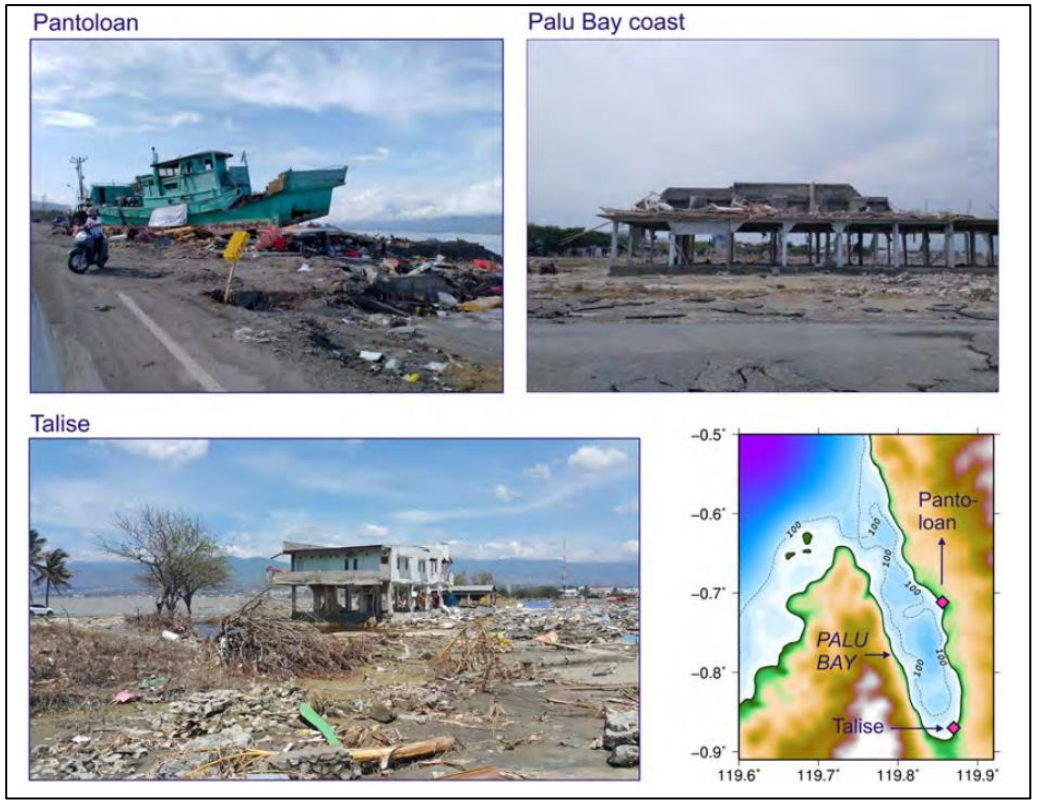
Indonesia, home to various natural hazards

- 2004 Sumatra-Andaman earthquake/tsunami: > 130,000 deaths
- 2006 Bengkulu earthquake/tsunami: > 700 deaths
- 2010 Mentawai earthquake/tsunami: > 500 deaths
- 2018 Anak Krakatau tsunami: > 450 deaths
- 2018 Palu earthquake/tsunami: > 4000 deaths
- 2022 West Java earthquake & landslide: > 600 deaths



Project team surveying Anak Krakatau tsunami

← Field surveys of the Palu tsunami

Project aims and components

1) **Producing new data**
2) Modeling credible hazard scenarios
3) Developing resilience guidelines

An alliance for hazard data generation

1- Data generation

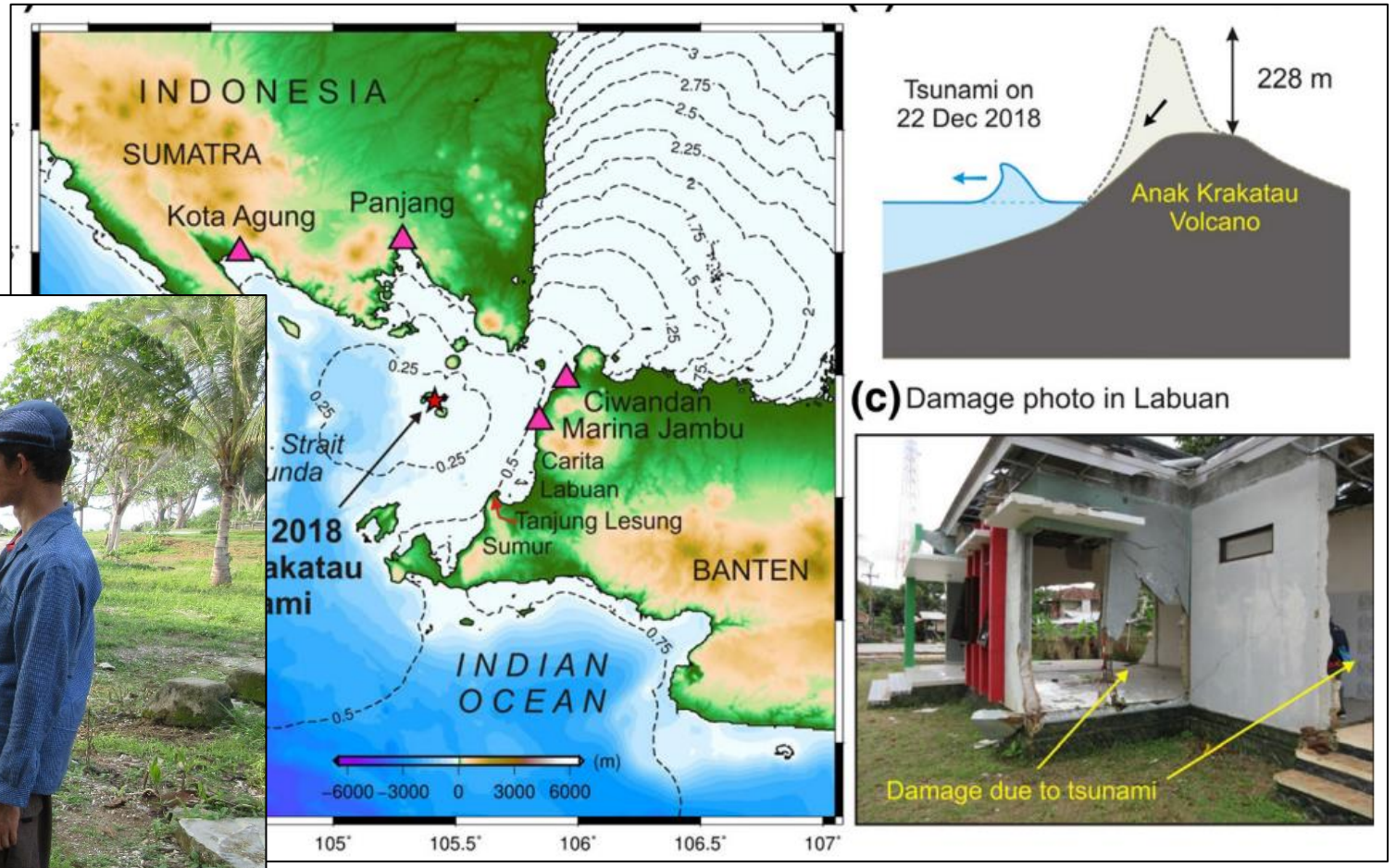
Marine data

- Most expensive data!
- This project conducted one of the very few marine seismic surveys in Indonesia

Anak tsunami (Dec 2018)

Dec 2018 Anak Krakatau tsunami

- More than 450 death

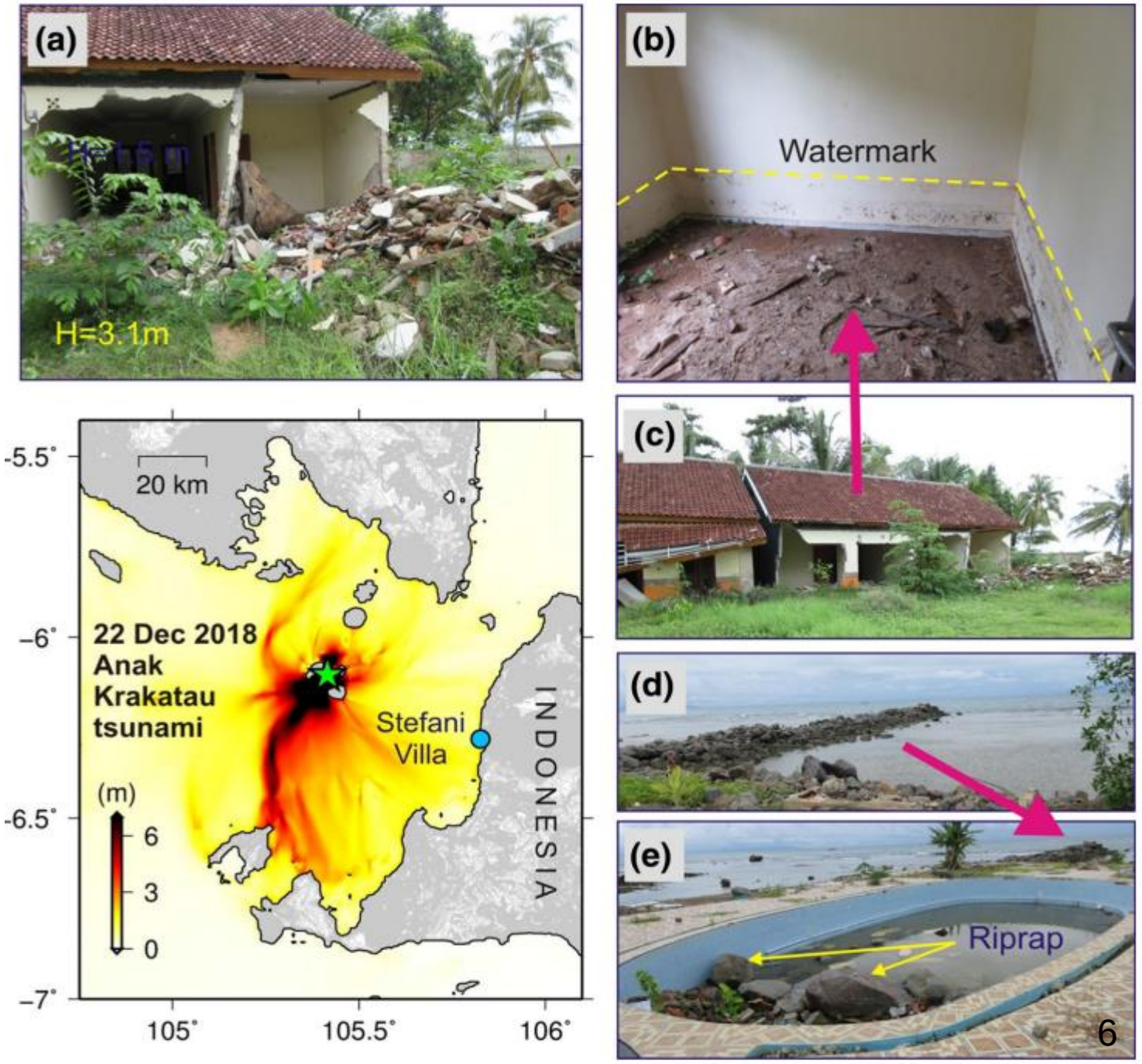


https://doi.org/10.1007/s00024-020-02587-w

Anak tsunami (Dec 2018)

In Stefani villa, large rock armour units of a jetty were moved inland and caused damage and death

46 people killed here.



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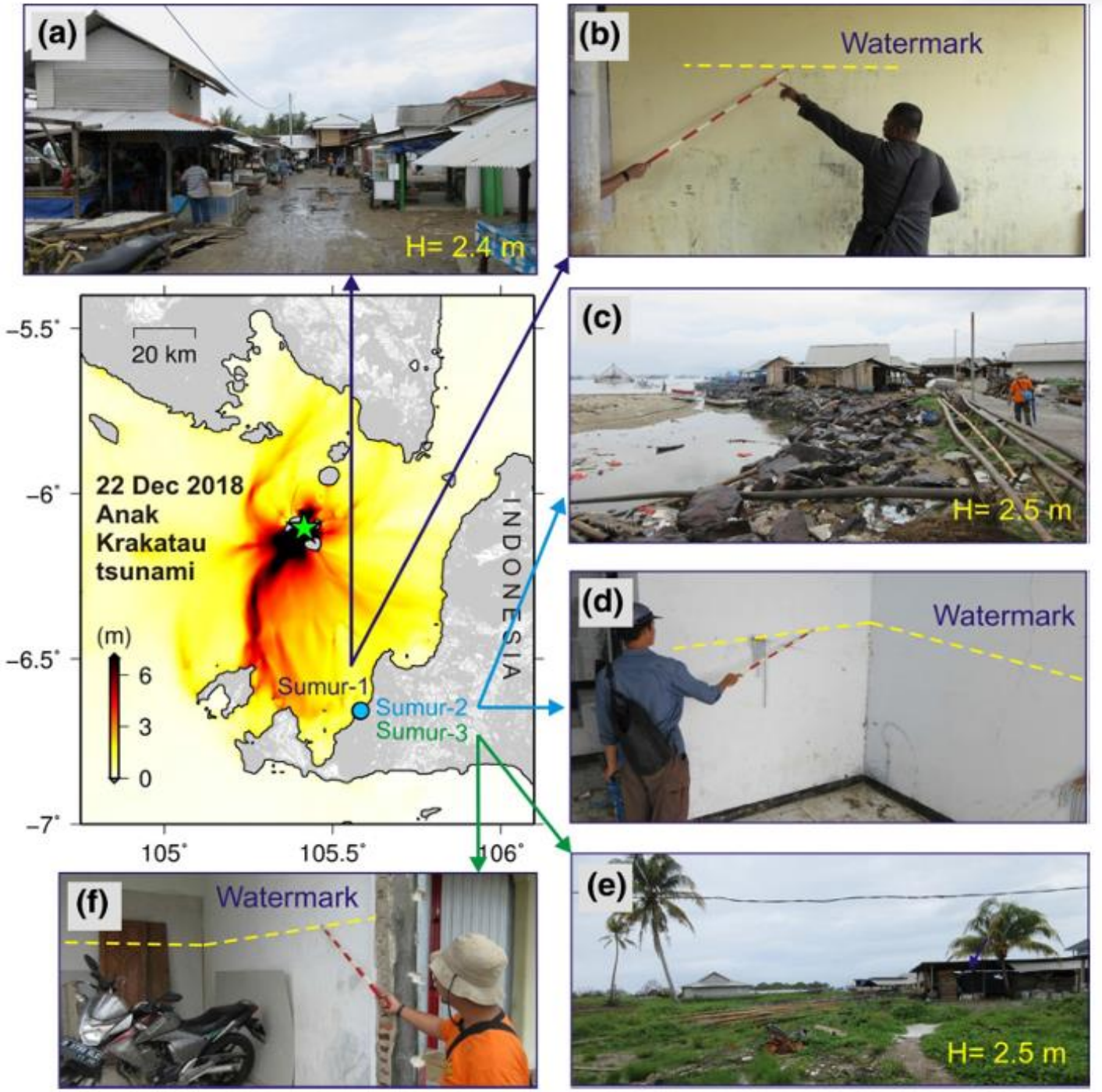
Anak tsunami (Dec 2018)

- 70 deaths were observed in Sumur although tsunami height was H = 2.5 m.
- Reason: extremely low-lying coastal land here plus the close distance of houses to the shoreline (5 -20 m)



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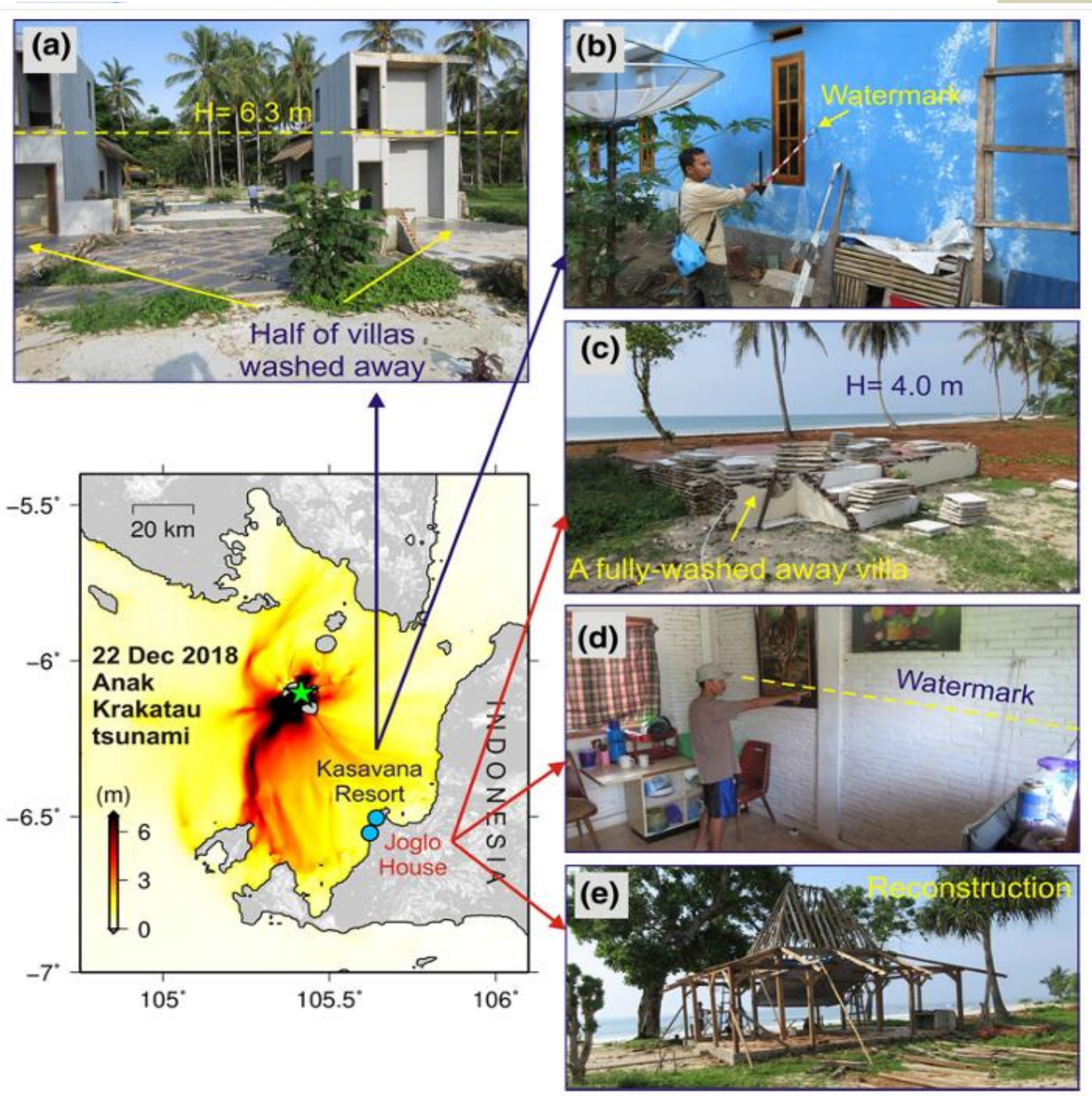
Anak tsunami (Dec 2018)

- Kasavana Beach Resort and Joglo Beach house.
- 18 deaths
- Most casualties and destruction were concentrated within 100 m from the coastline during this event.



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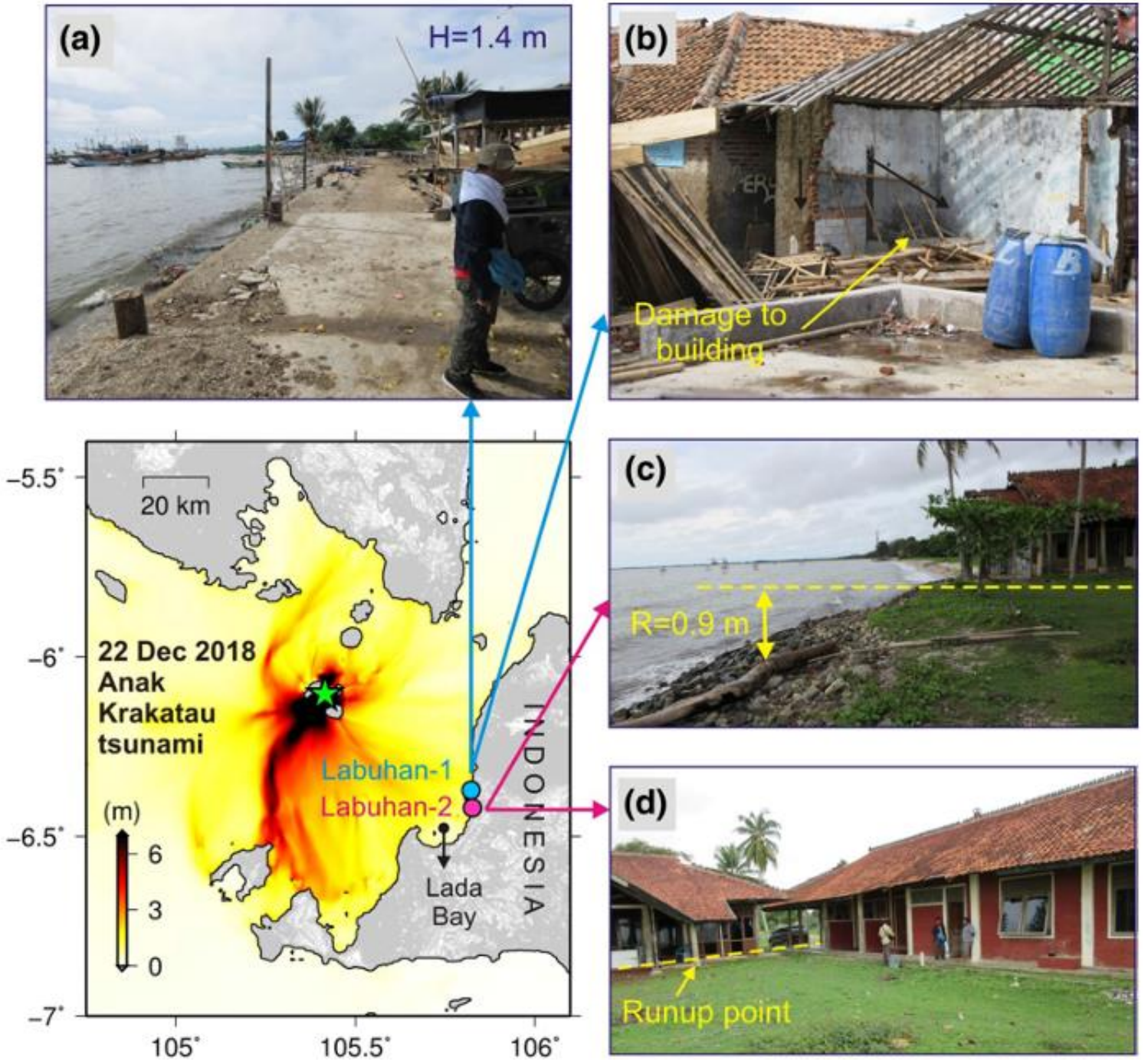
Anak tsunami (Dec 2018)

- Labuhan
- 2 deaths
- Tsunami height H= 0.9 – 1.4 m
- Houses ae very close to the coast



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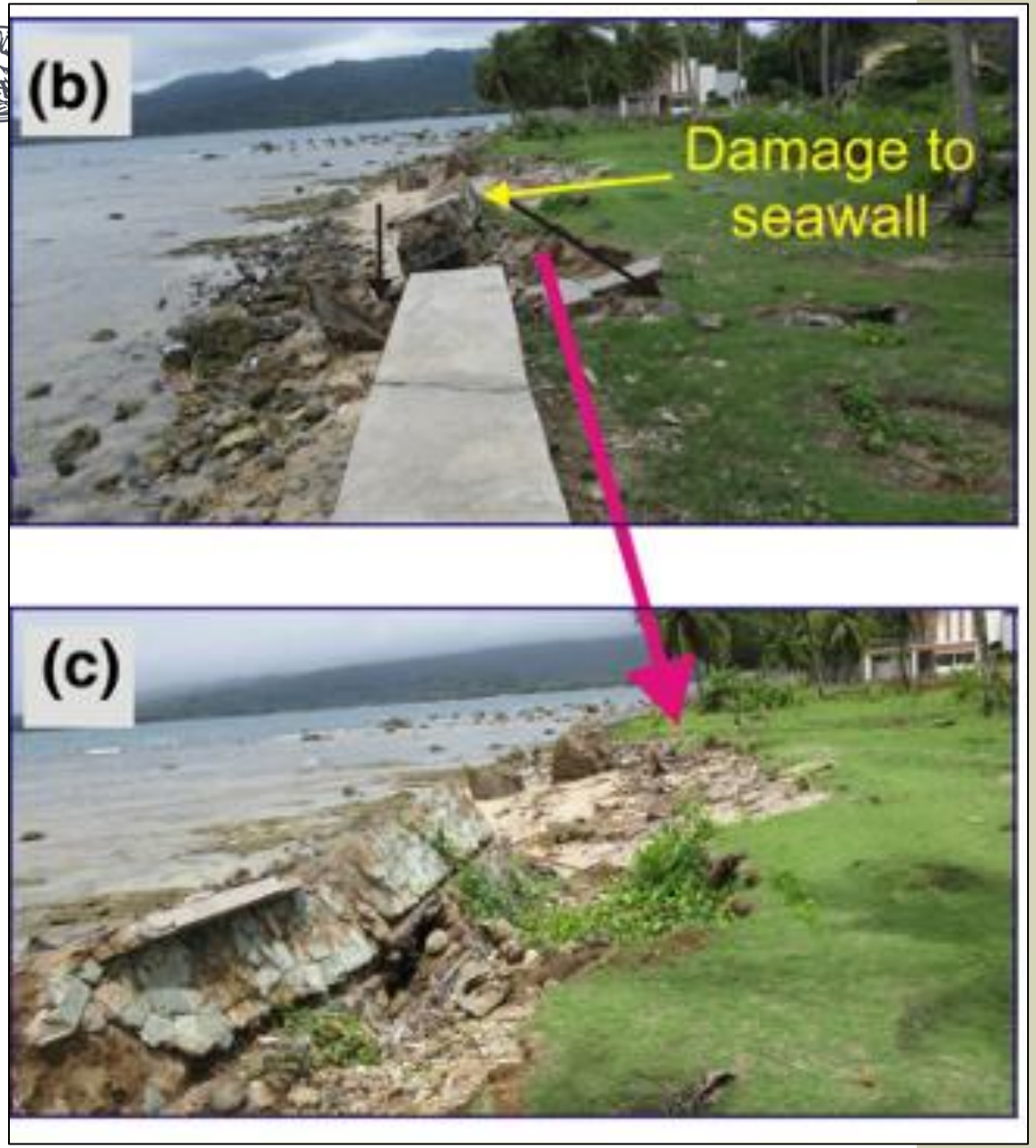
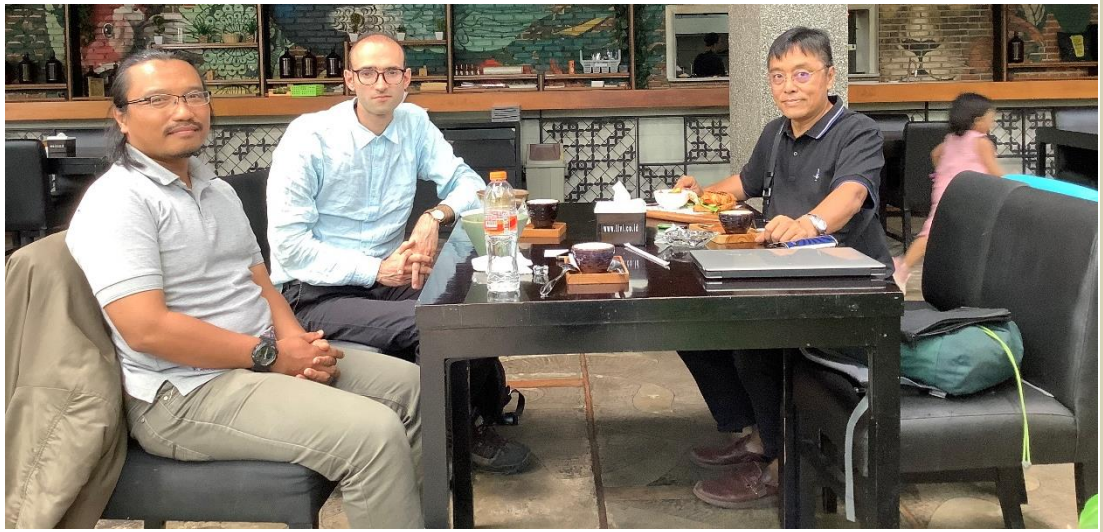
Anak tsunami (Dec 2018)

Failure modes:

- Complete washing-away
- Direct wave impacts
- Overturning
- Sliding
- Foundation scour





Anak tsunami (Dec 2018)

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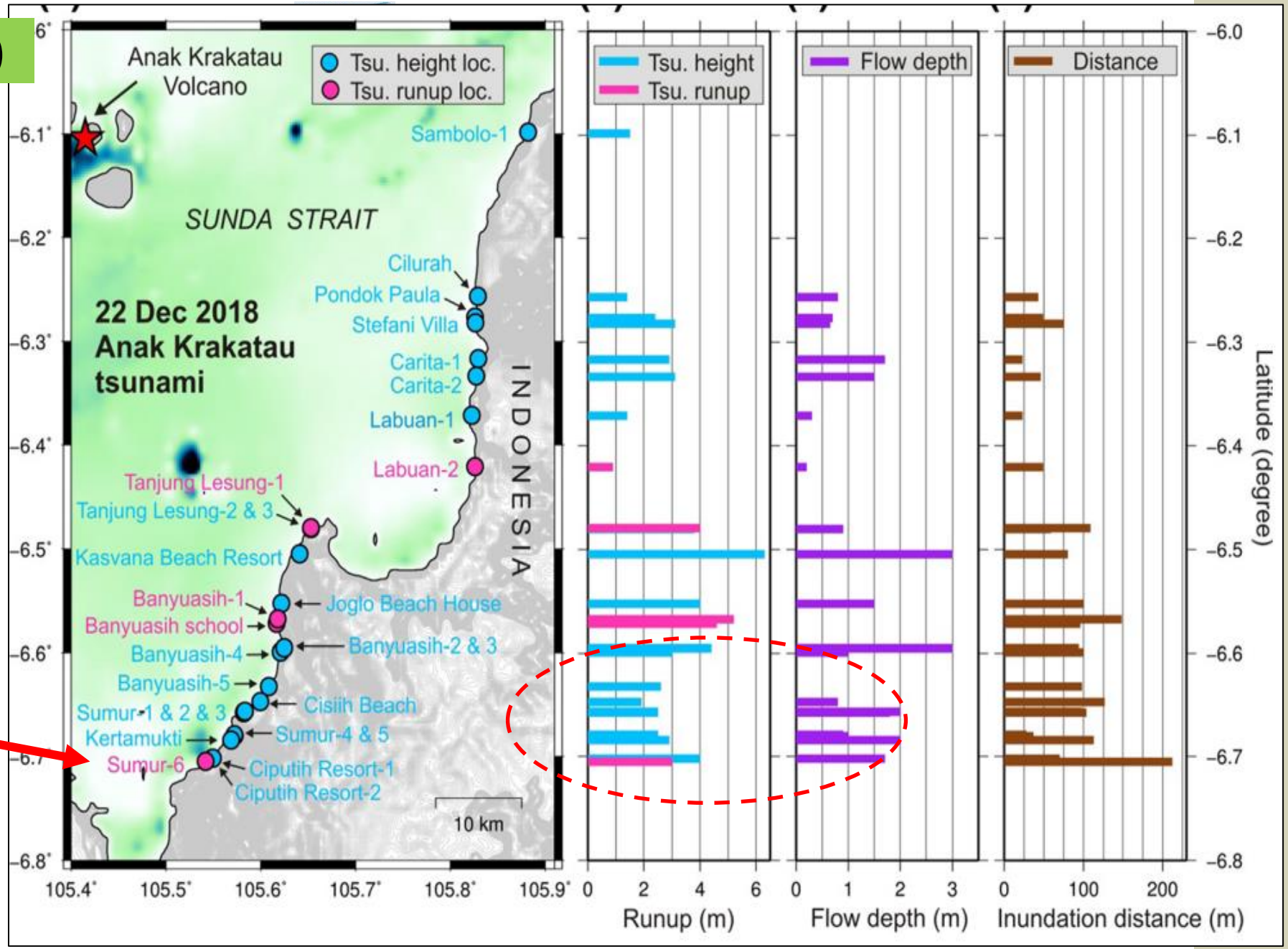
Over 50 deaths in **Sumur** with wave height of around 2-3 m



Summary

- For more information, see the project website here: https://sites.google.com/view/tsuindonesia
- Importance of DATA: we need to actively generate data on earthquakes and tsunami hazards and risks in Indonesia.
- Most damage was concentrated at the distance of up 100 m from the coast. This is most likely due to the short wavelength of the volcano-generated tsunami.
- The fatal combination of low-lying coastal areas and close distance of the houses to the shoreline was responsible for most casualties.

Please get in touch for collaboration on Indonesia tsunami hazards

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Twitter: https://twitter.com/Mo_Heidarzadeh
Project website:
https://sites.google.com/view/tsuindonesia

Thank you

Today's presentations files:

All presentation files are available in the website below:

https://www.oceanblogs.org/earthquakeandtsunami/news-and-opportunity/

NEWS AND OPPORTUNITIES

2023-11-20: International seminar on tsunami research (open to public), with speakers from Japan, UK and New Zealand.

Date & time: Monday 20th Nov 2023 at 1:30 PM (local time).

Location: Hybrid. On-site at University of Bath (BA2 7AY, building CB, Room 5.6) and virtually via TEAMS (see the link below and the QR code on the poster). For remote connection, click on the TEAMS link here: https://lnkd.in/e3VUSDne

The seminar is open to public, both on-site or virtually. For questions, contact Dr Mohammad Heidarzadeh (mhk58@bath.ac.uk).

Speakers are:

- **Prof Alison Raby** (for presentation file click here)
- **Mr Furkan Demir** & **Mr Gunay Gazaloglu** (for presentation file click here)
- **Dr Ramtin Sabeti** (for presentation file click here)
- **Dr Colin Whittaker** (for presentation file click here)
- **Dr Anawat Suppasri** (for presentation file click here)
- **Dr Mohammad Heidarzadeh** (for presentation file click here)