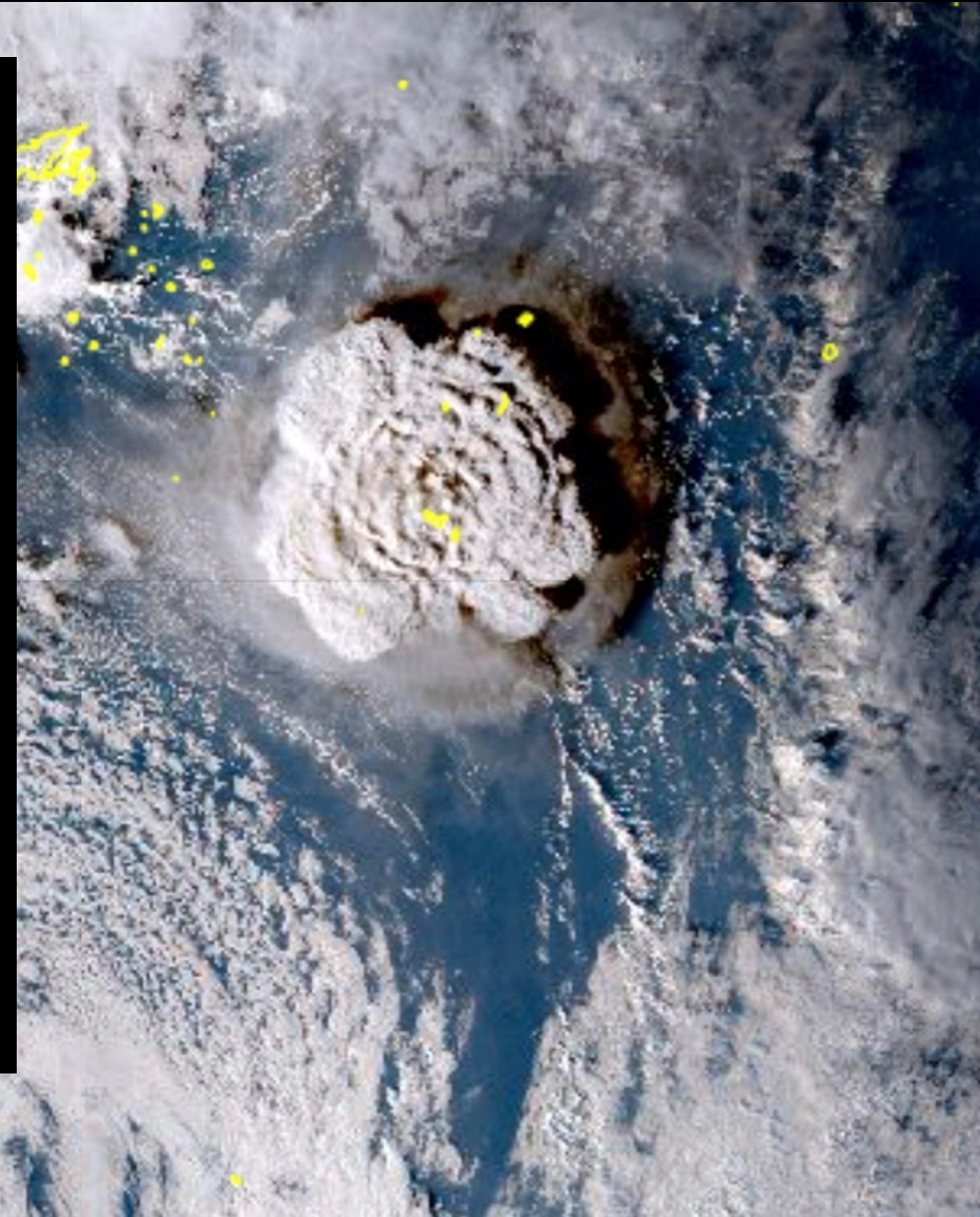
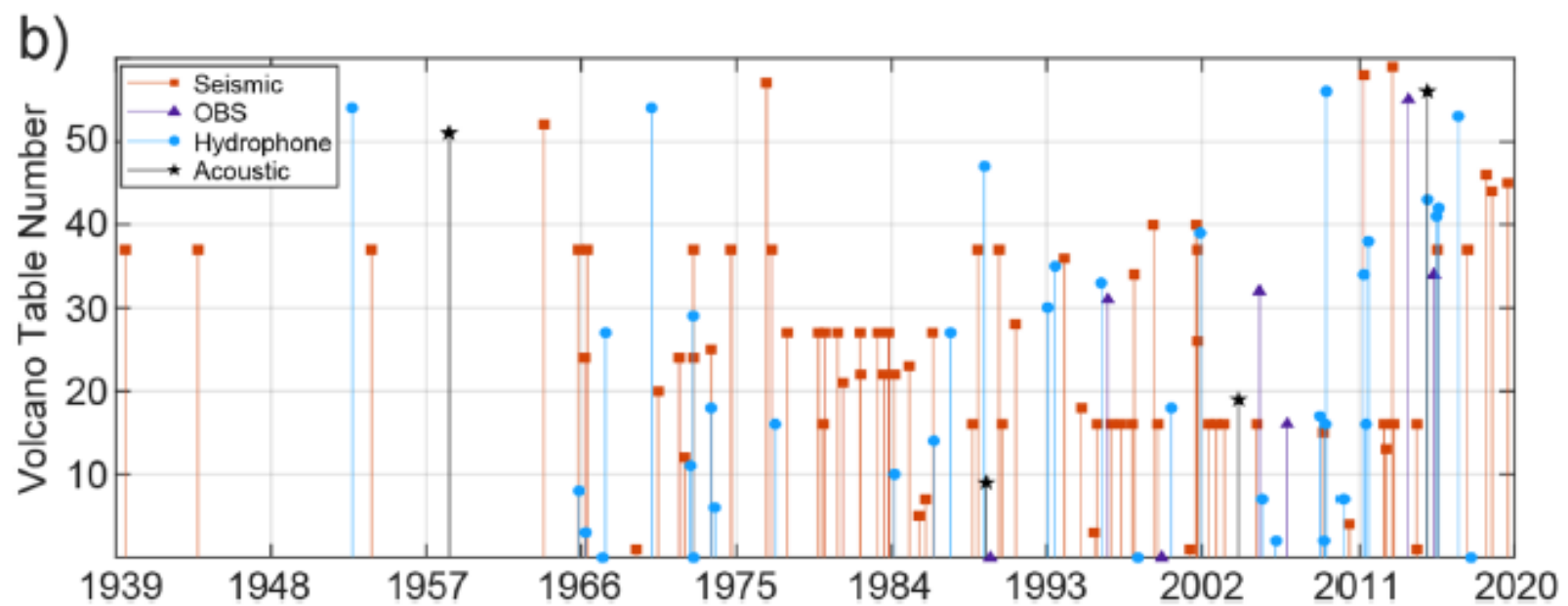
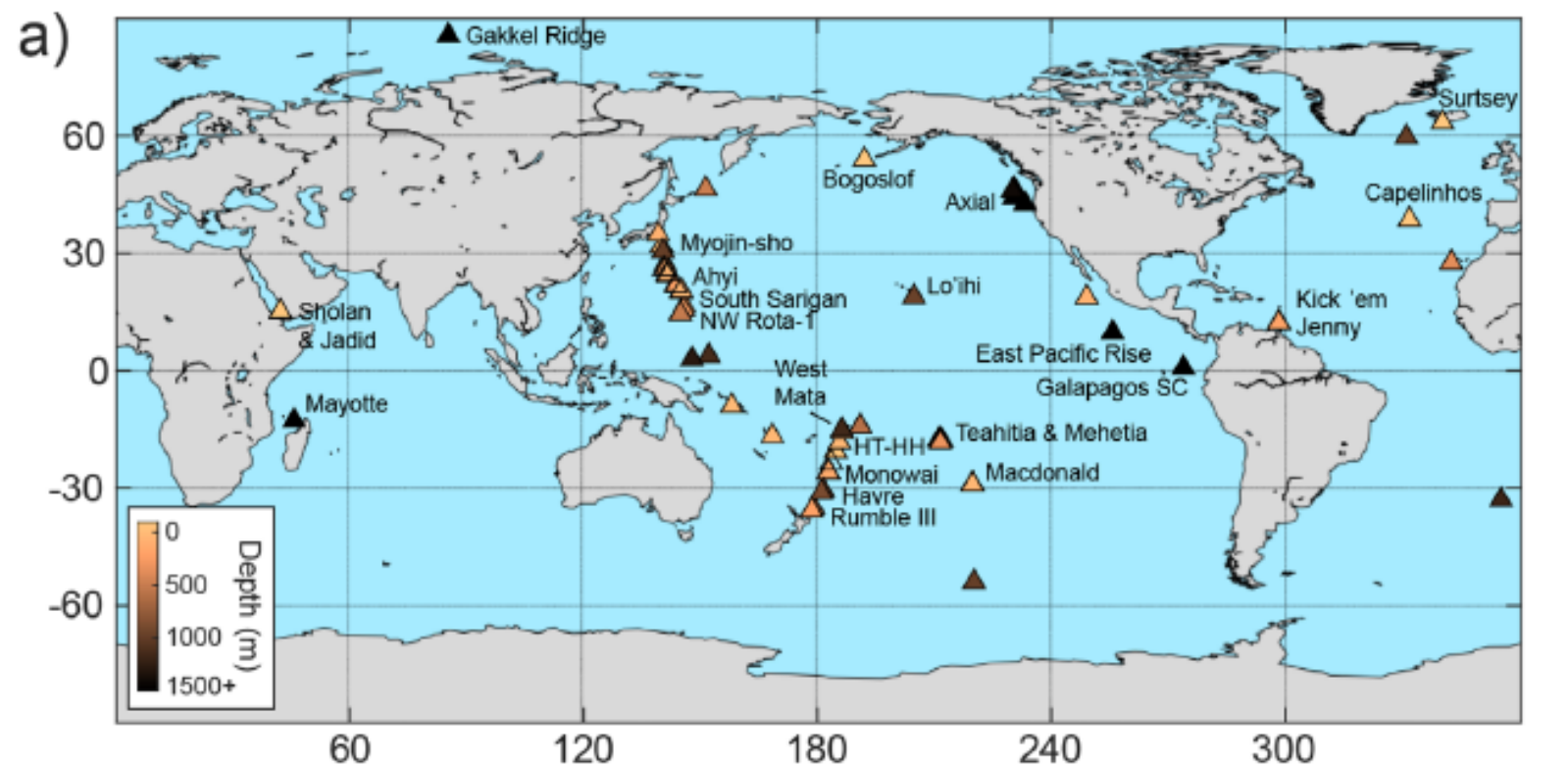


Volcanism in the world's oceans

- ~75% or more of the planet's volcanism occurs beneath the sea, yet only two deep (>500 m) eruptions have ever been witnessed, and only a handful of others recorded with in situ instrumentation.
- How much do we know that these processes and their associated hazards?
- What is our best approach to addressing these fundamental questions?



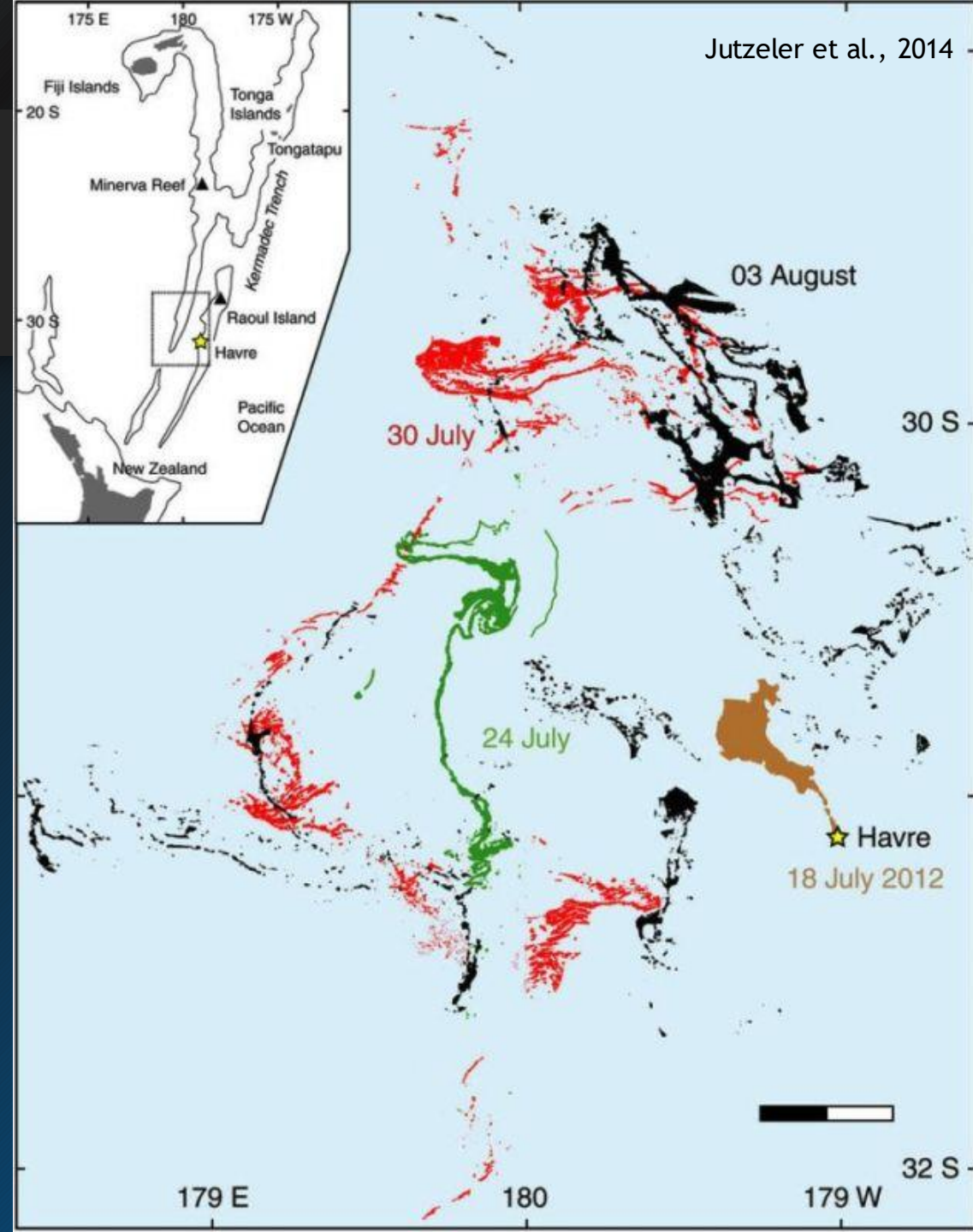


How frequently, and with what volume, do submarine volcanoes erupt?

- Global magma budget
- Lifecycle of oceanic crust
- Volatile flux
- Connections with biologic communities and hydrothermal systems

What types of eruptive behaviors are exhibited by submarine volcanoes?

- Pressure/volatile relationships
- Sediment budget
- Volatile flux

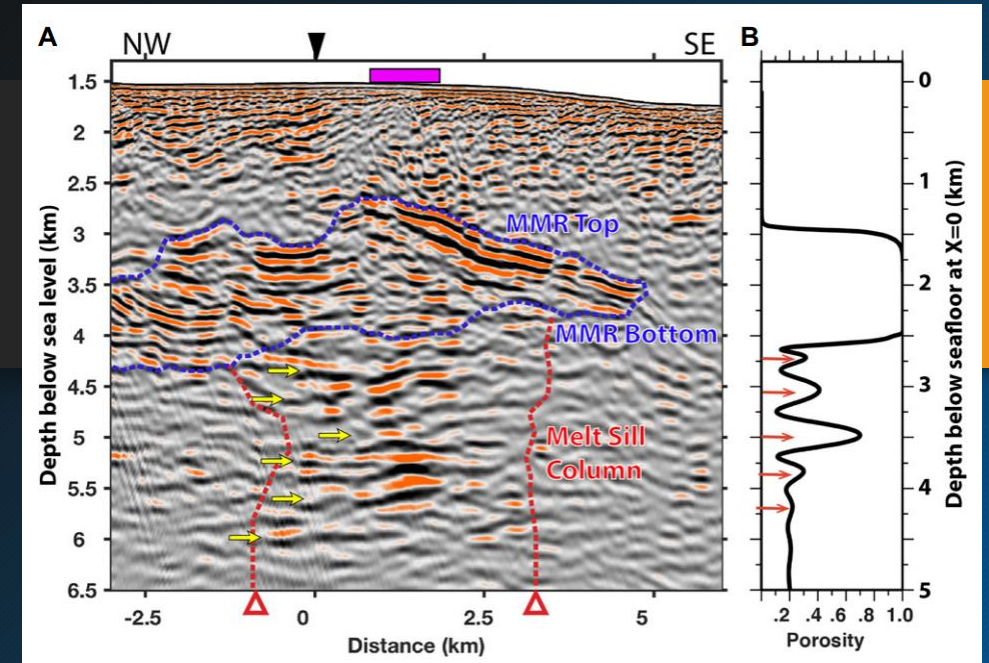


How well do we understand hazards associated with submarine volcanism?

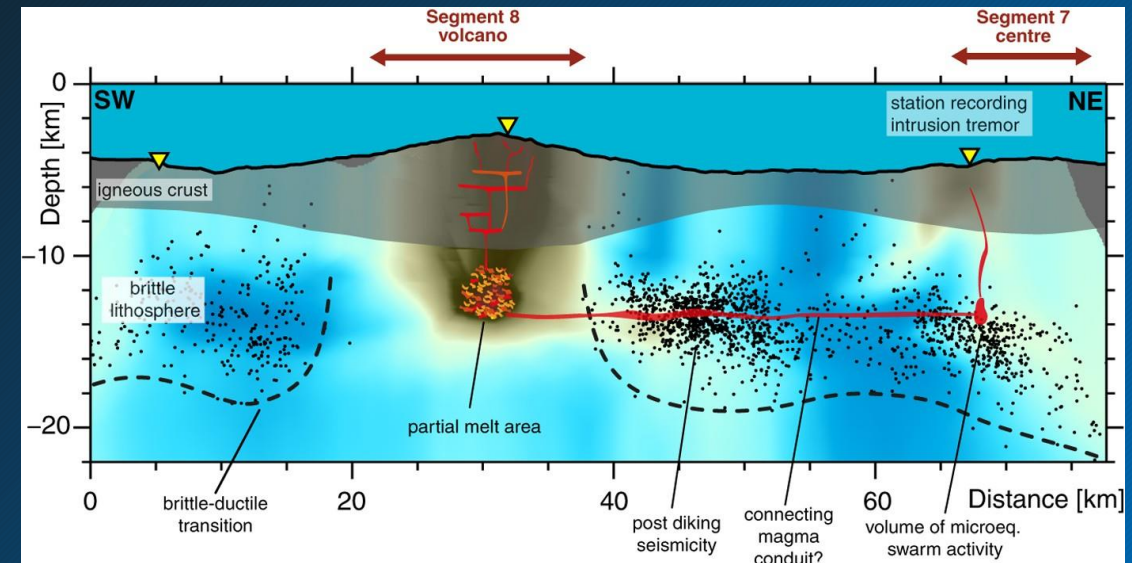
- Tsunamis
- Submarine landslides
- Eruption columns
- Pumice rafts

What do we know about magmatic structures in submarine volcanic systems?

- Magma chamber size/depth/continuity
- Connection with spreading rate, flux



Carbotte et al., 2020



Schmid et al., 2017

Submarine volcanoes are simpler and easier to model than subaerial volcanoes but are much harder to access.

How can we understand these systems without placing instruments on each one?



Critical instrumentation

- Ocean-bottom seismometers
 - Campaign or continuous (cabled)
 - Passive or active source studies
- Hydrophones
 - Ocean-wide monitoring
 - Detection of earthquakes, eruptions, landslides, biological phenomena
 - Baseline soundscape data
 - Need more to fill gaps caused by bathymetry
- Seafloor geodesy
 - Magma volume, forecasting

