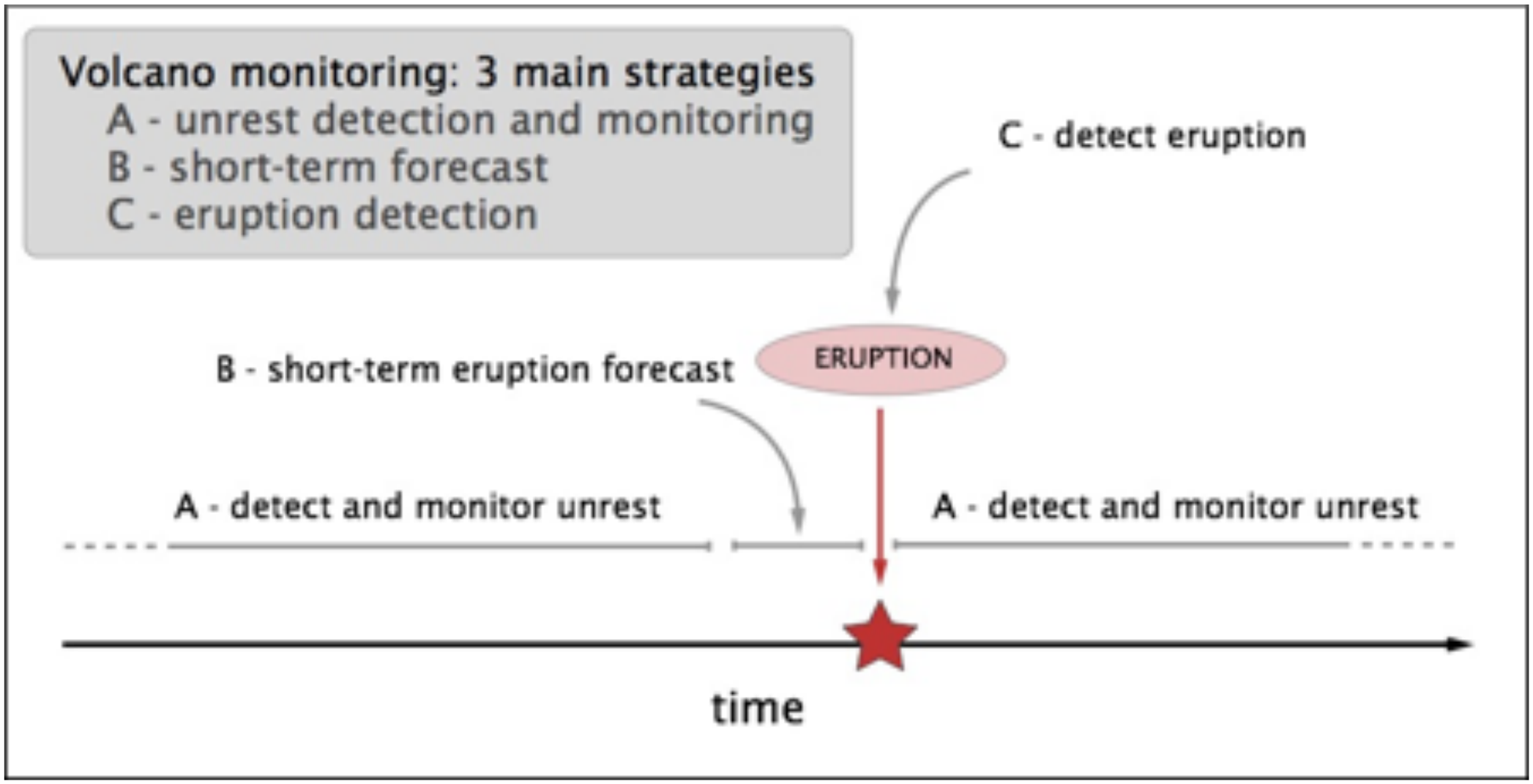
Volcano observatories: why they matter and how they can help

Nico Fournier & GeoNet volcano monitoring group
GNS Science, New Zealand

Volcano observatories primarily focus on acute risk to life safety near volcanoes

Pinatubo, Philippines, June 1991 Alber Garcia

Volcano observatories primarily focus on acute risk to life safety near volcanoes



Volcanoes can also impact aviation in different ways

Volcanoes impact aviation on the ground

5-10 mm of ash

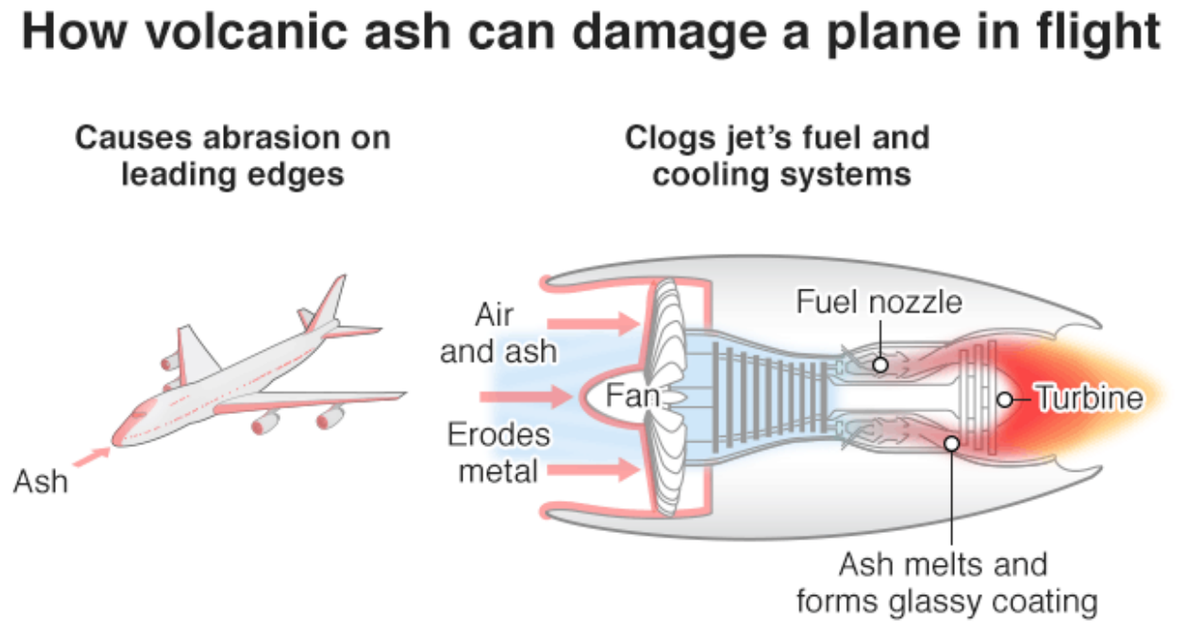
AFP, 2011

Planes grounded in *Argentina* in June 2011 by the Cordon-Caulle eruption in *Chile.*

Airport close for 31 days due to the on-going ashfall, remobilisation of ash and cleanup.

Volcanoes impact aviation in the air

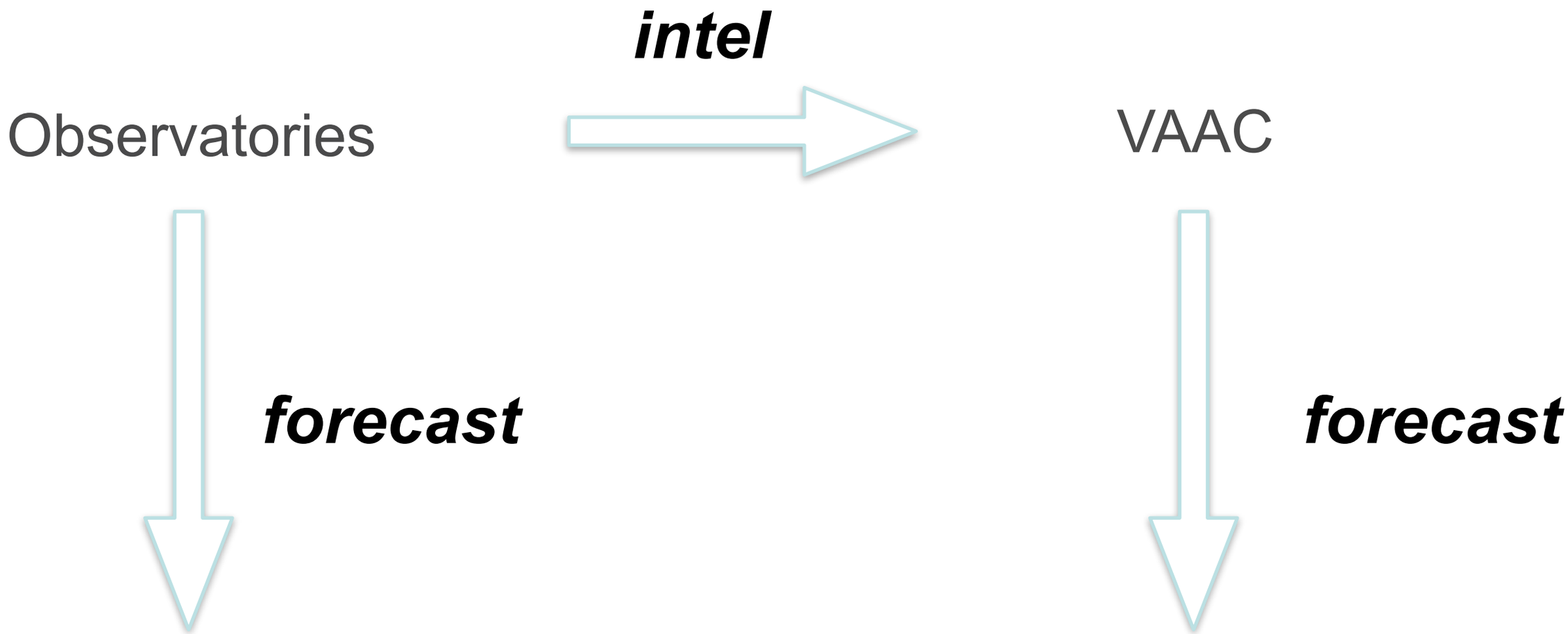
Etienne de Malglaive / Getty Images



Eyjafjallajokull eruption in Iceland (2010) caused airspace mayhem in Europe.

Mount Agung in Bali (2017) disrupted the local economy

Observatories provide essential *forecast* and *intel*



Observatories provide essential *forecast* and *intel*

enablers

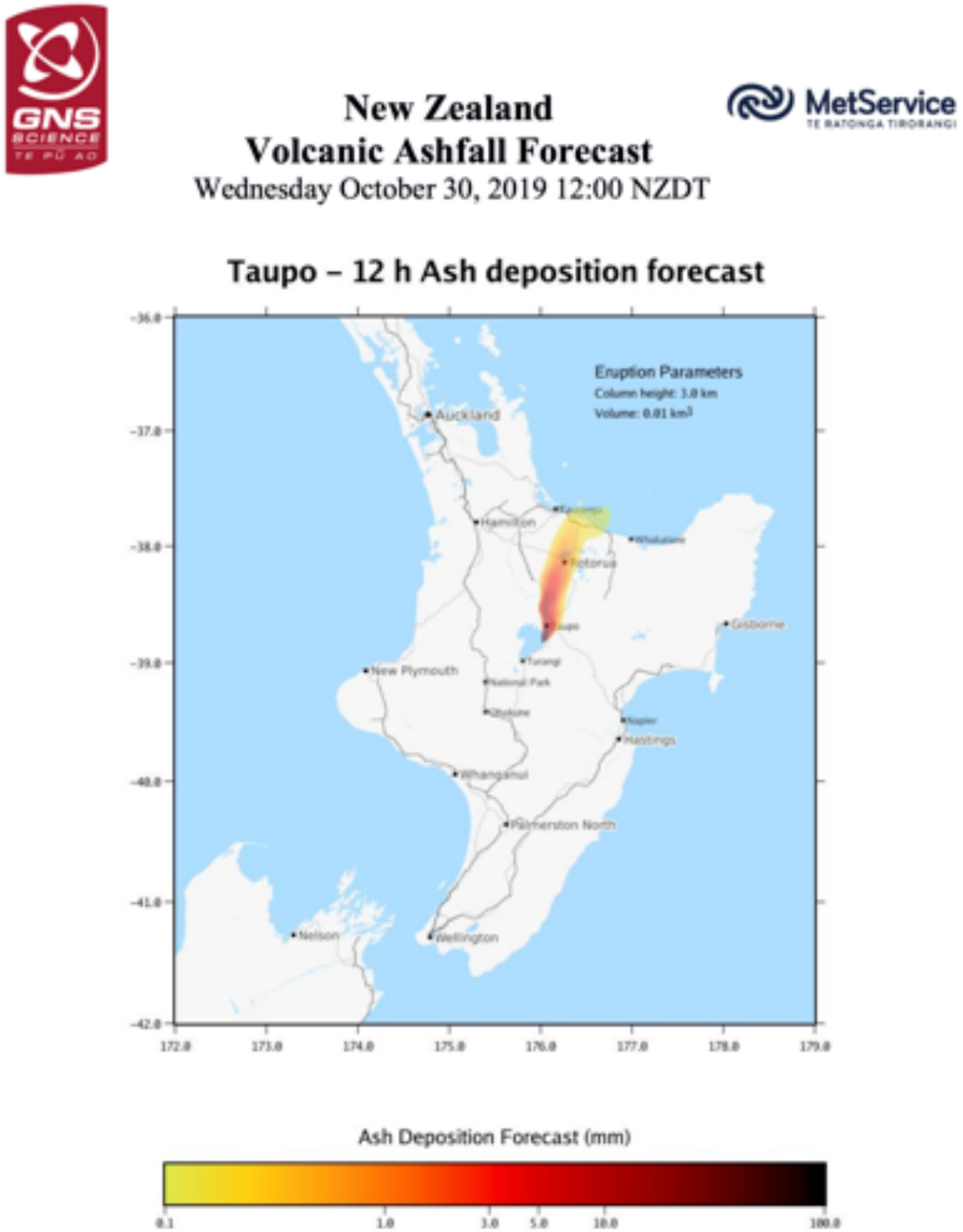
Observatories → VAAC

do-ers

Ashfall
(on the **ground**)

Ash dispersion
(in the **air**)

Observatories provide essential ***forecast*** and *intel*

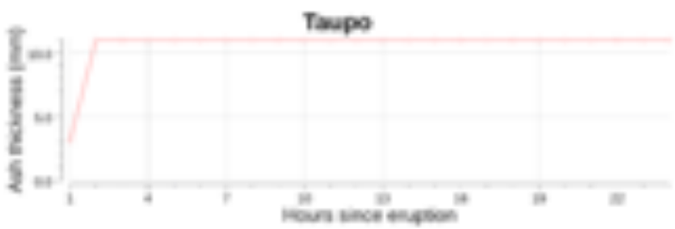


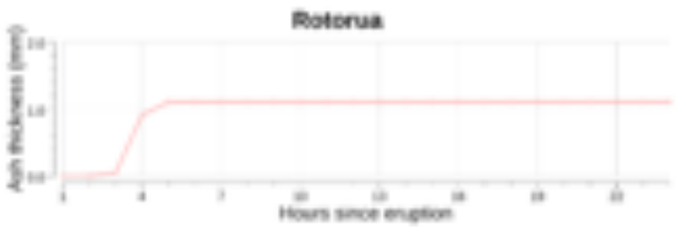
Observatories provide essential ***forecast*** and *intel*

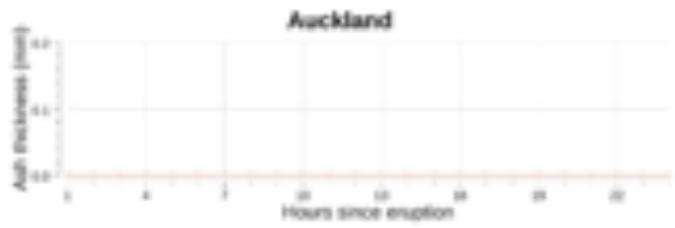
New Zealand
Volcanic Ashfall Forecast
Wednesday October 30, 2019 12:00 NZDT

Eruption source:	Taupo
Eruption time:	30 October 2019 10:10 NZDT
Forecast duration (24 hours):	Ends at 31 October 2019 10:10 NZDT

Cumulative ashfall at selected points of interest for the forecast duration:







When there aren't volcano observatories…

Is there an eruption?

Is it big?

Where??

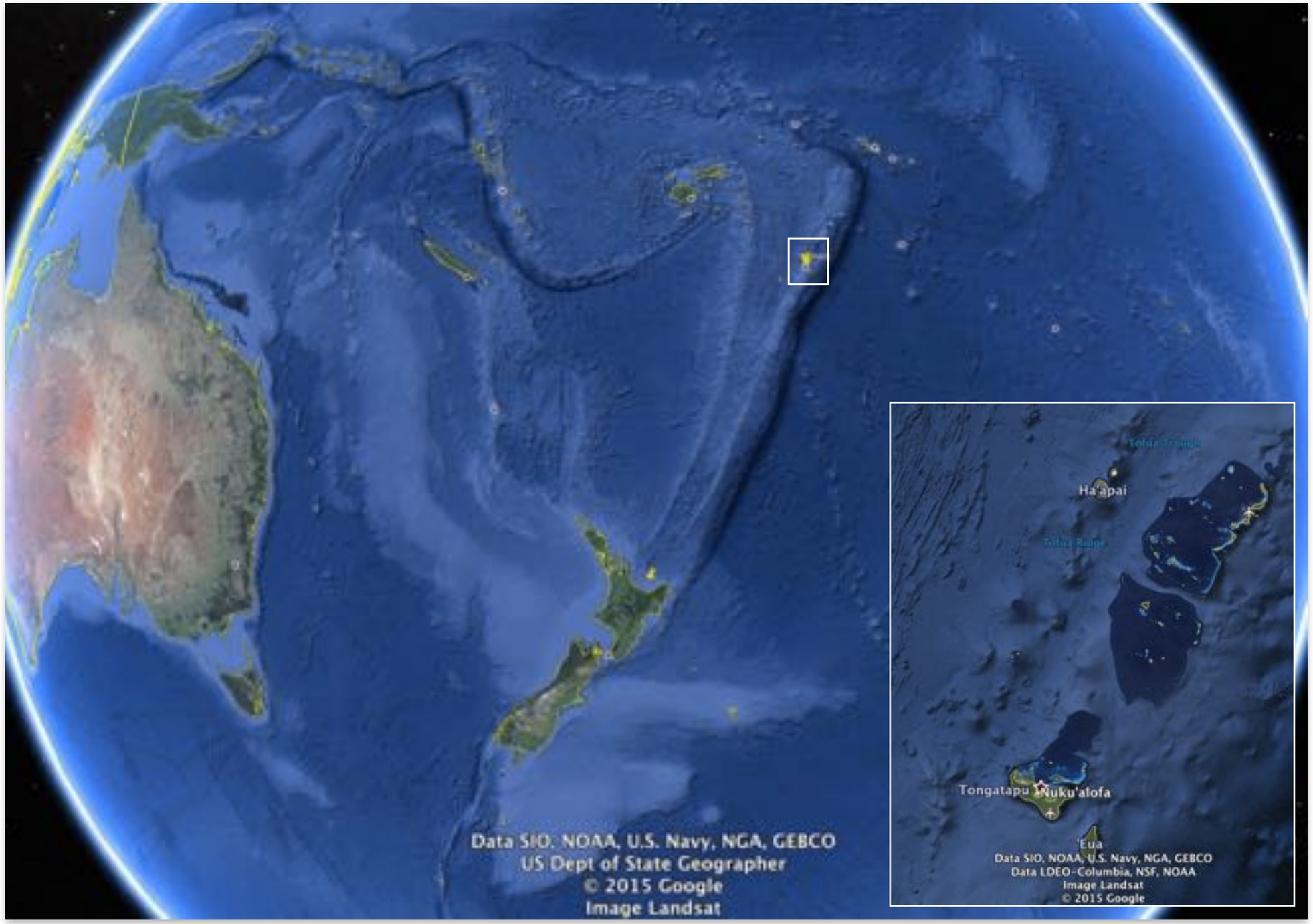
How high is the **ash** going?

Is it still going on ?

VAAC may be able to provide intel with Satellite imagery, but it can be difficult, especially with cloud cover

VAAC has to rely on unverified (at best), or unreliable (at worst) reports

Tonga 2014-2015



VA Advisory

FVPS01 NZKL 112251~
VA ADVISORY
DTG: 20150111/2251Z
VAAC: WELLINGTON
VOLCANO: HUNGA TONGA-HUNGA HAAPAI 243040
PSN: S2034 W17522
AREA: TONGA
SUMMIT ELEV: 149M
ADVISORY NR: 2015/23
INFO SOURCE: PILOT OBSERVATION.
AVIATION COLOUR CODE: UNKNOWN
ERUPTION DETAILS: **OBS VA TO FL160 AT 11/2036Z**
OBS VA DTG: 11/2300Z
EST VA CLD: SFC/FL160 S2045 W17600 - S2045 W17330 - S2145 W17345 - S2115 W17600 - S2045 W17600 FL160/600
NO VA EXP
FCST VA CLD+6 HR: 12/0500Z SFC/FL160 S2030 W17600 - S2100 W17215 - S2215 W17230 - S2200 W17600 - S2030 W17600 FL160/600 NO VA EXP
FCST VA CLD+12 HR: 12/1100Z SFC/FL160 S2030 W17600 - S2015 W17330 - S2100 W17030 - S2230 W17115 - S2215 W17300 - S2245 W17600 - S2030 W17600 FL160/600 NO VA EXP
FCST VA CLD+18 HR: 12/1700Z SFC/FL160 S2015 W17545 - S2000 W17245 - S2130 W16945 - S2300 W16930 - S2315 W17145 - S2300 W17400 - S2300 W17530 - S2245 W17615 - S2015 W17545 FL160/600 NO VA EXP
RMK: **VOLCANO OBSCURED BY CLOUD. PILOT REPORT OF DARK VA CLOUD UP TO FL160 AND APPROX 10NM AROUND THE ISLAND. CONTINUOUS ERUPTION.**
NXT ADVISORY: NO LATER THAN 20150112/0500Z=

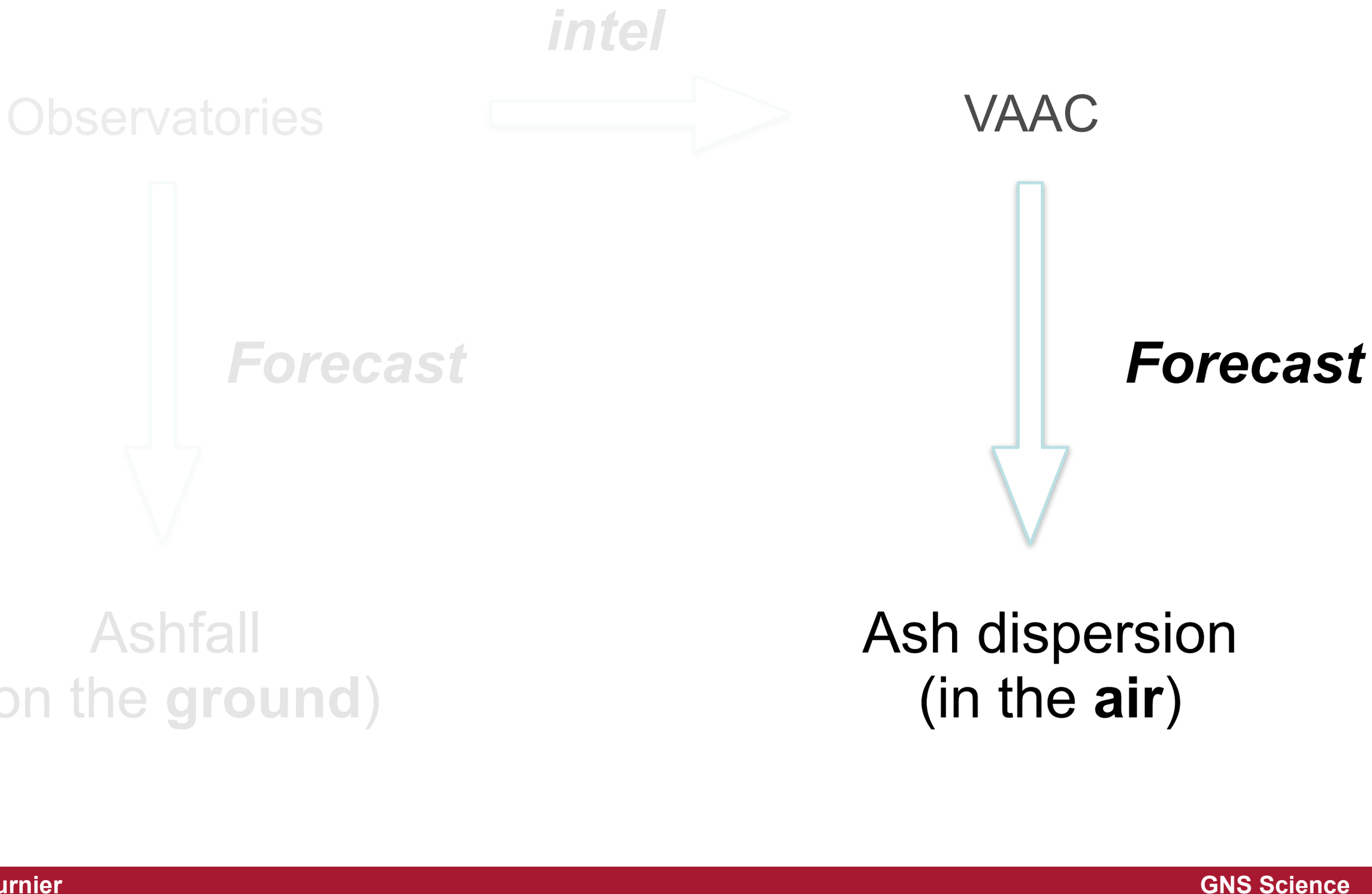
Reports of ash at high elevation, leading to cancellation of regional and international flights for several days

Lack of flights began to create a serious economic threat

Meet Hunga Tonga Hunga Ha’apai

Significant presence of ash at *low* elevations only

Difficulties in providing *intel* to VAAC



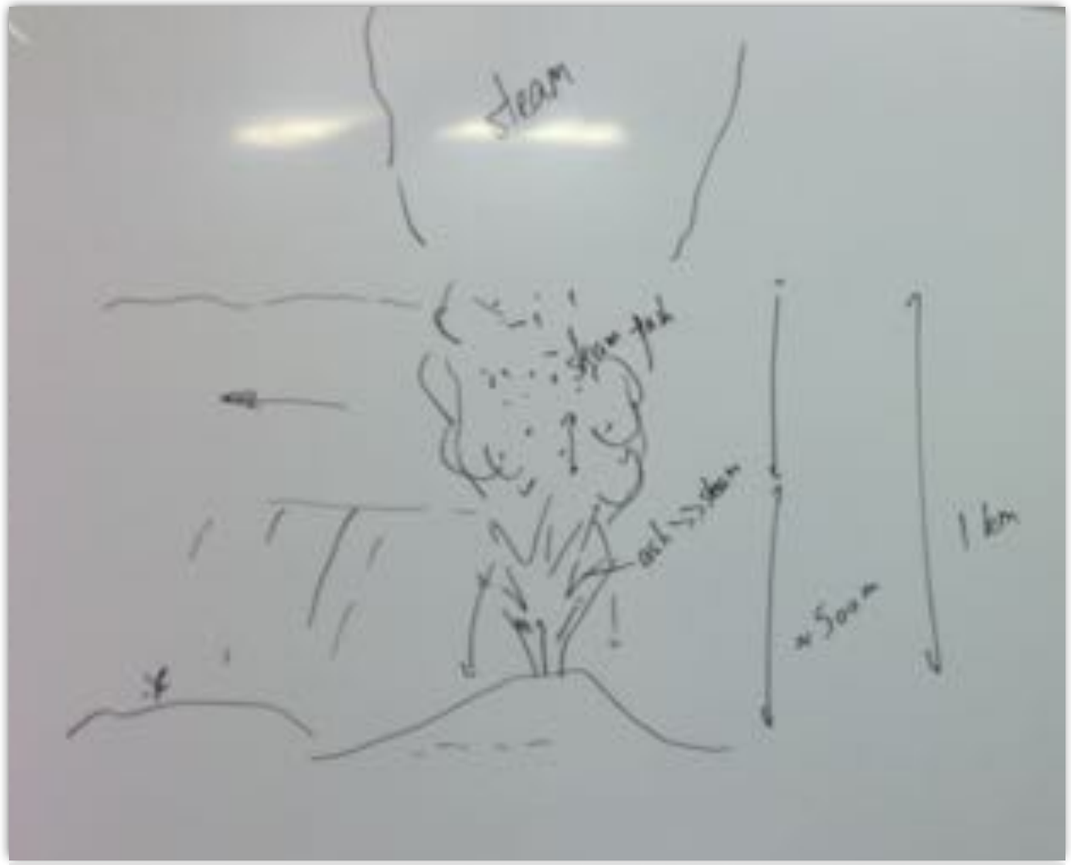
“Plumometer”

PVC pipe + elbow + trigonometry = “plumometer"!

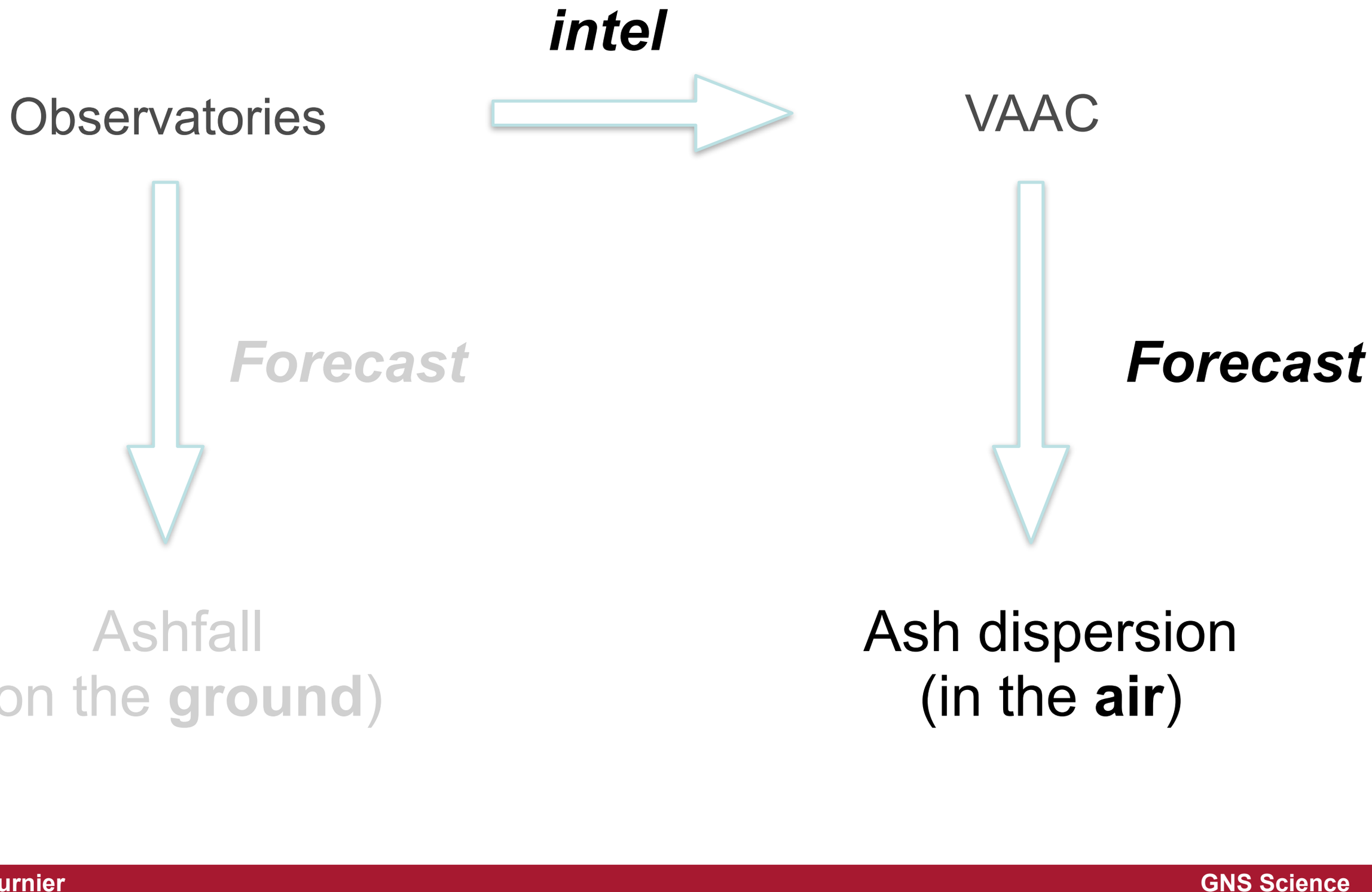
“Plumometer”

Report relevant information

Distinguish *ash* vs *steam* plume in reports to VAAC



Increased ability to provide *intel to VAAC & aviation*



Observatories are do-ers and enablers *prior*, *during* and *after* an eruption

Before the eruption: when possible, provide an indication that an eruption is more likely

During/immediately after an eruption: information about the eruption (height, size, type - e.g., steam vs ash, **duration)**

After the eruption: confirmation of end of eruption, likelihood of further eruption

Some resources for ash impact - posters

https://www.gns.cri.nz/Home/Learning/Science-Topics/Volcanoes/Eruption-What-to-do/Ash-Impact-Posters/

(accessed 1/10/20)

Volcanic ash fall advice in HTML poster versions for:

- Advice for waste water-managers
- Advice for water supply managers
- Advice for roading managers
- Advice for airport operators
- Advice for power transmission and distribution system operators
- Advice for power plant operators
- Advice for facilities managers: buildings
- Advice for all facilities managers: gensets and HVAC
- Advice for facilities managers: computers and electronics
- Advice for urban clean-up operations

Back home <<

Some resources for ash impact - Airport operators

(accessed 1/10/20)

Thanks

More info:
geonet.org.nz
gns.cri.nz

Twitter:
@geonet
@gnsscience
@nicovolc