

Possible Future Collaborative Work in Eastern Thailand on Australasian Impact Geology

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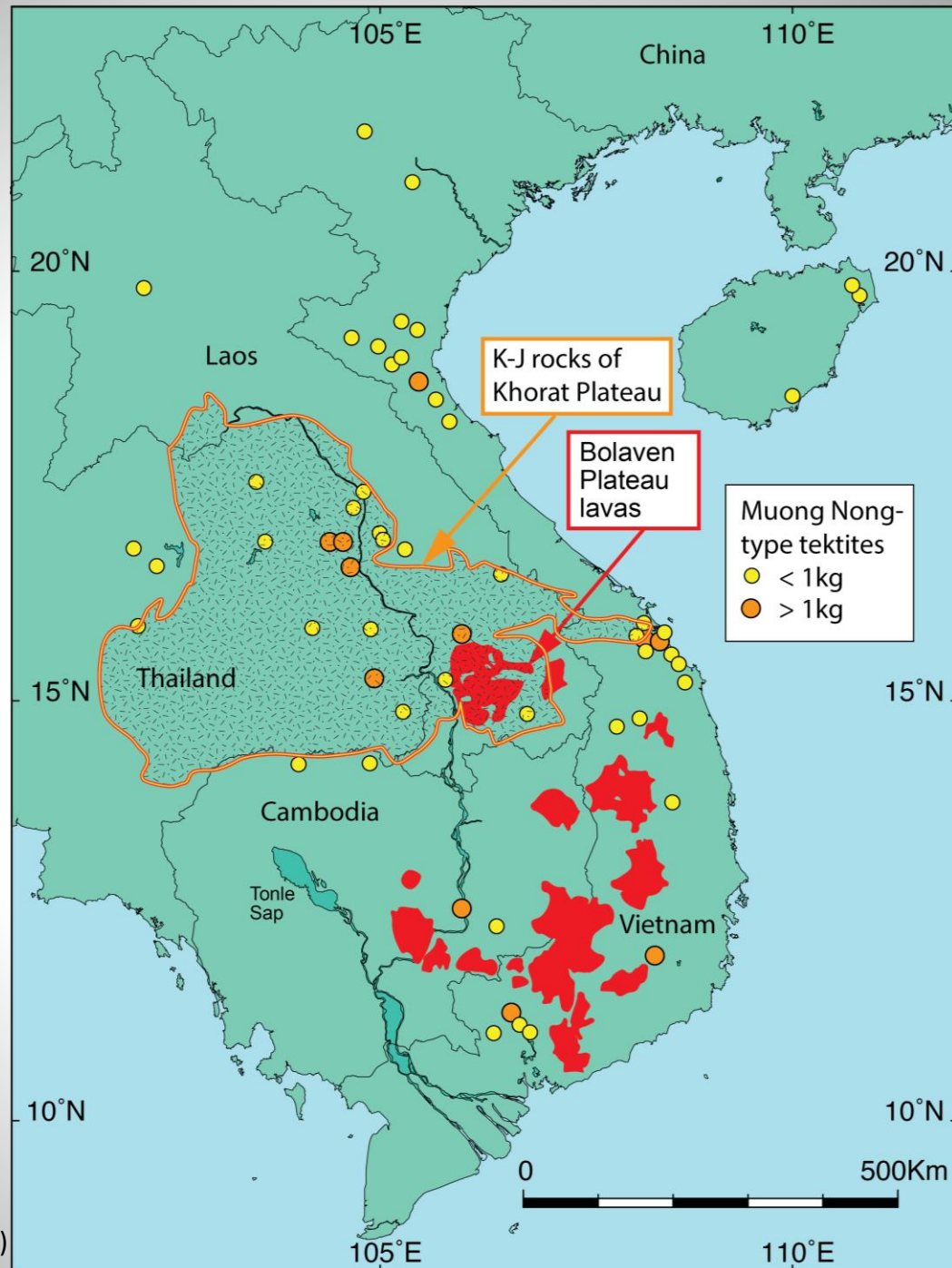
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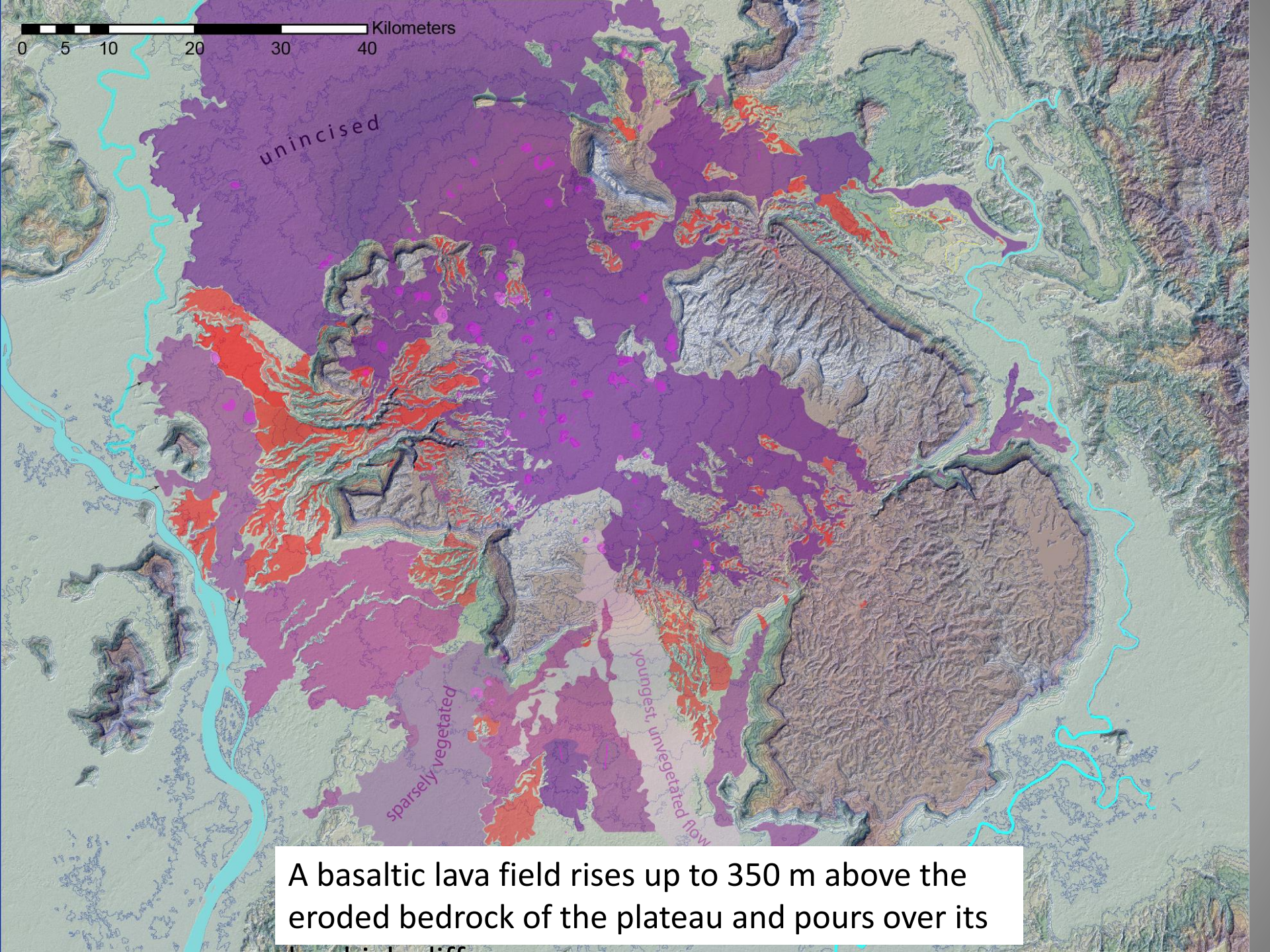
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We think we've found the site of the crater from which the Australasian tektites emanated –

beneath the basaltic lavas of the Bolaven Plateau





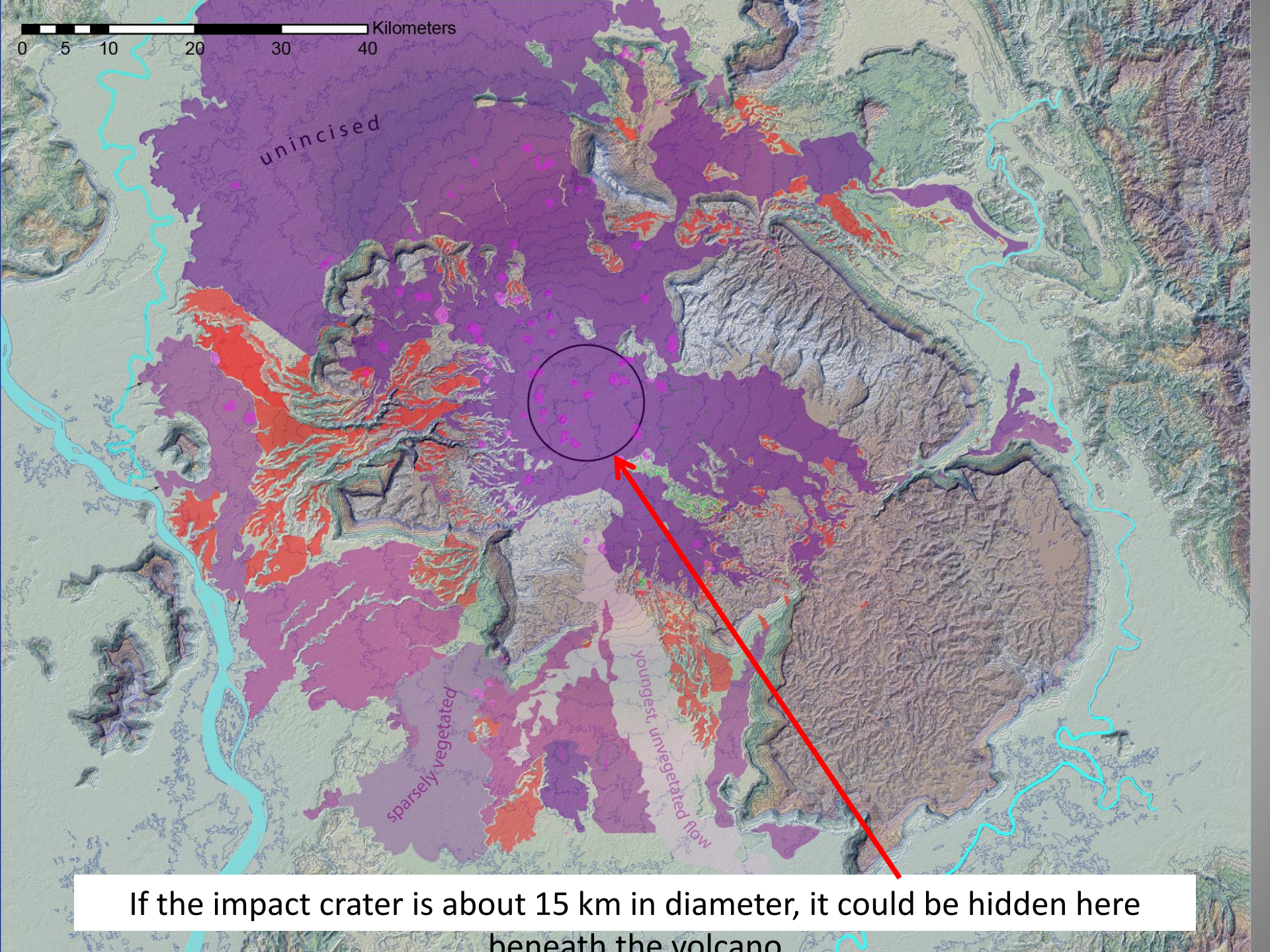
0 5 10 20 30 40 Kilometers

unincised

sparsely vegetated

youngest, unvegetated flow

A basaltic lava field rises up to 350 m above the eroded bedrock of the plateau and pours over its



0 5 10 20 30 40 Kilometers

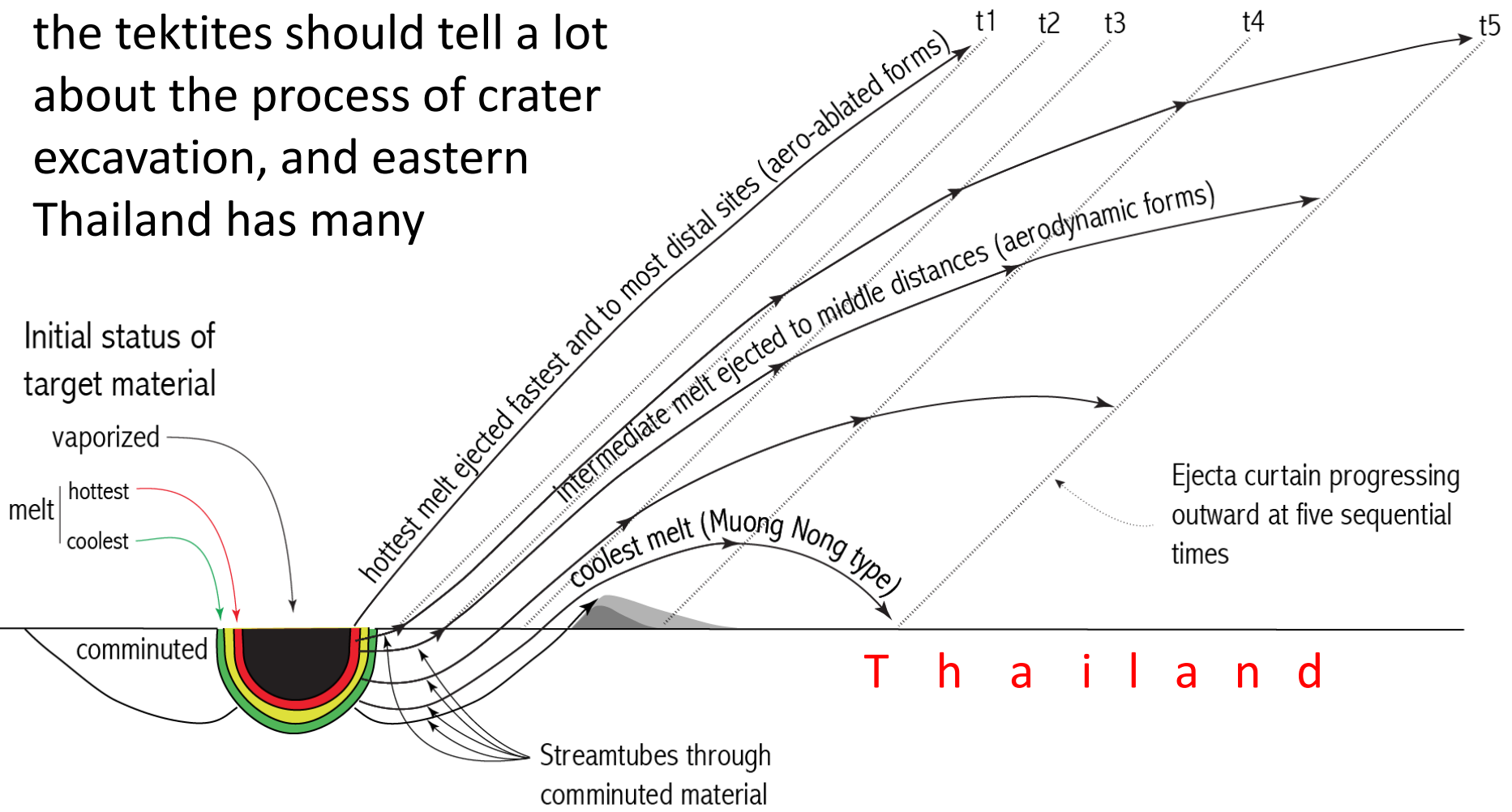
unincised

sparsely vegetated

youngest, unvegetated flow

If the impact crater is about 15 km in diameter, it could be hidden here beneath the volcano

The deposits associated with the tektites should tell a lot about the process of crater excavation, and eastern Thailand has many



Adapted from Melosh (1989)

If this physical concept of crater excavation is correct, where are the non-tektite components of the ejecta and

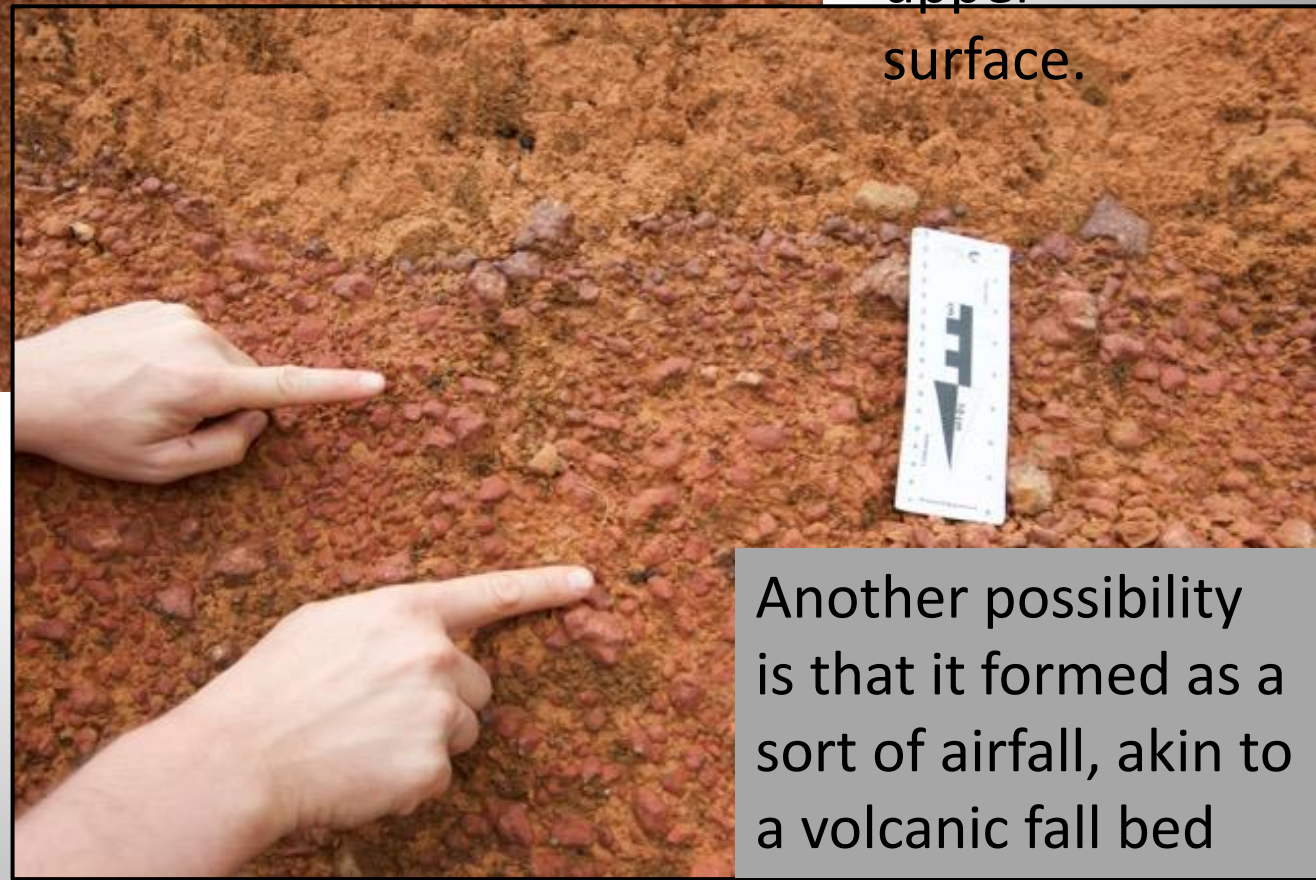
In many locations the Muong Nong type tektites are associated with both a loose, pebbly to cobbly bed and an overlying massive silty bed

The pebbly/cobbly bed consists primarily of clasts of lateritic soil, but there are also sparse quartz pebbles, and sandstone and mudstone clasts





The pebbly laterite commonly has tektites at or within 15 cm of its upper surface.



One possibility is that this deposit formed as the impact shock wave propagated across the lateritic surface,

Another possibility is that it formed as a sort of airfall, akin to a volcanic fall bed



Collection and examination of such deposits in eastern Thailand will help resolve this question

In many places in Laos and eastern Thailand, a sandy silt overlies the pebbly laterite and tektite bed, always in sharp contact



This bed is at least part of what, some years ago, Thai geologists proposed to be the Catastro-loess, a product of the Australasian impact



GEOTHAI '07 International Conference on
Geology of Thailand: Towards Sustainable Development
and Sufficiency Economy

AUSTRALASIAN COMETARY IMPACT, 0.8MA⁽³⁾ CATASTROLOESS BURIED ALIVE MIOCENE⁽¹⁾, PLIOCENE⁽²⁾ FAUNAS IN THAILAND AND CENTRAL AUSTRALIA, AND TEKTITE-BEARING FLOOD DEPOSITS IN NE. THAILAND. NEW WORLD'S DISCOVERY EXTINCTION AGE IN THAILAND (INDOCHINA), AND AUSTRALIA IMPACT FIELDS⁽⁴⁾

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Energy Resources of Southeast Asia — GEOSEA '98**

17 – 19 August 1998 • Shangri-La Hotel, Kuala Lumpur, Malaysia



Early Quaternary global terrestrial impact of a whole comet in the Australasian tektite field, newest apparent evidences discovery from Thailand and East Asia

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We've sampled this silty deposit in two localities –
on the eastern Bolaven Plateau and in western
Isan @ Chaiyaphum

We wanted to test
whether it originated as
windblown debris off of
an incinerated landscape
(catastro-loess hypothesis)

or ...

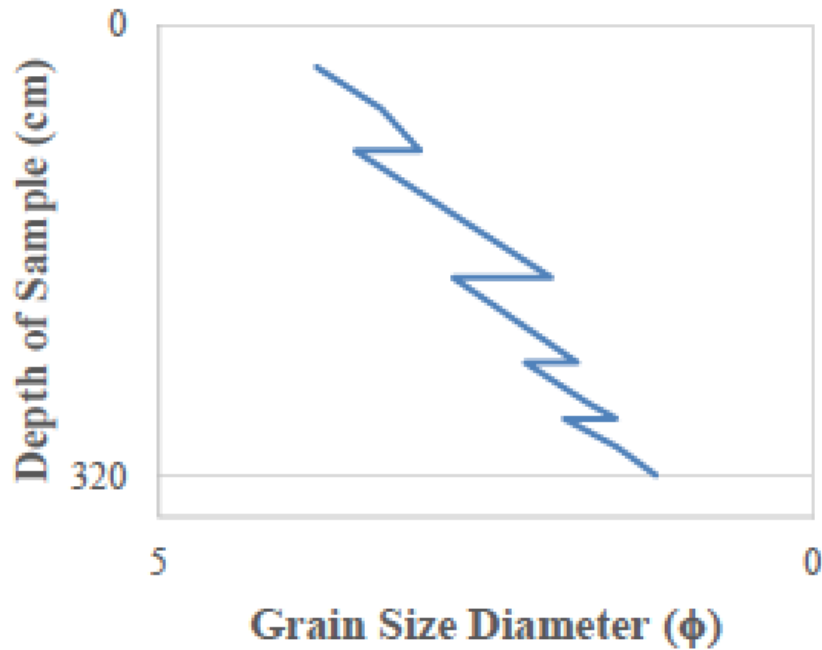
as the airfall from a
turbulent, convective
cloud rising off of the
impact site



One should be able to discriminate between the two hypotheses

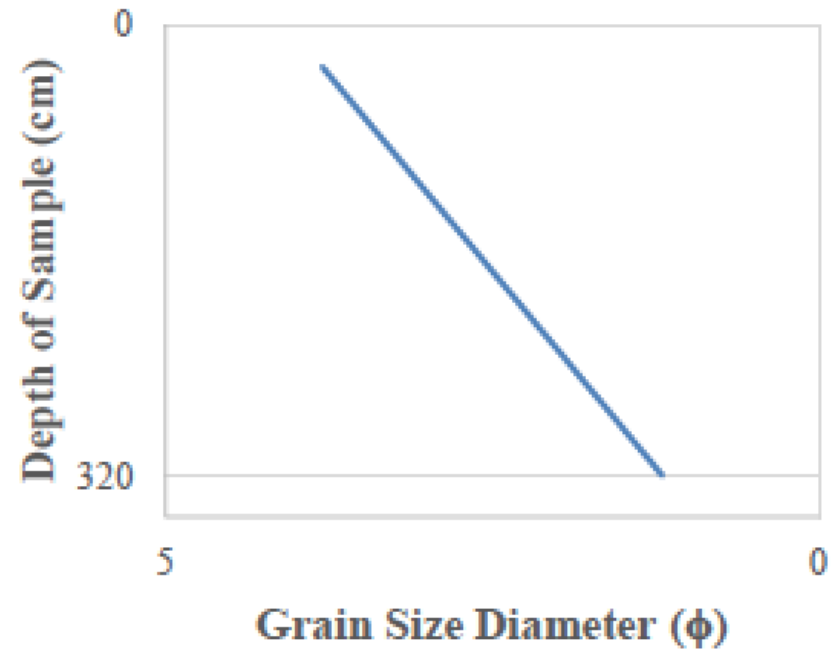
Catastroloess Hypothesis

Depth of Sample (cm) against Grain Size Diameter (ϕ)



Plume Hypothesis

Depth of Sample (cm) against Grain Size Diameter (ϕ)

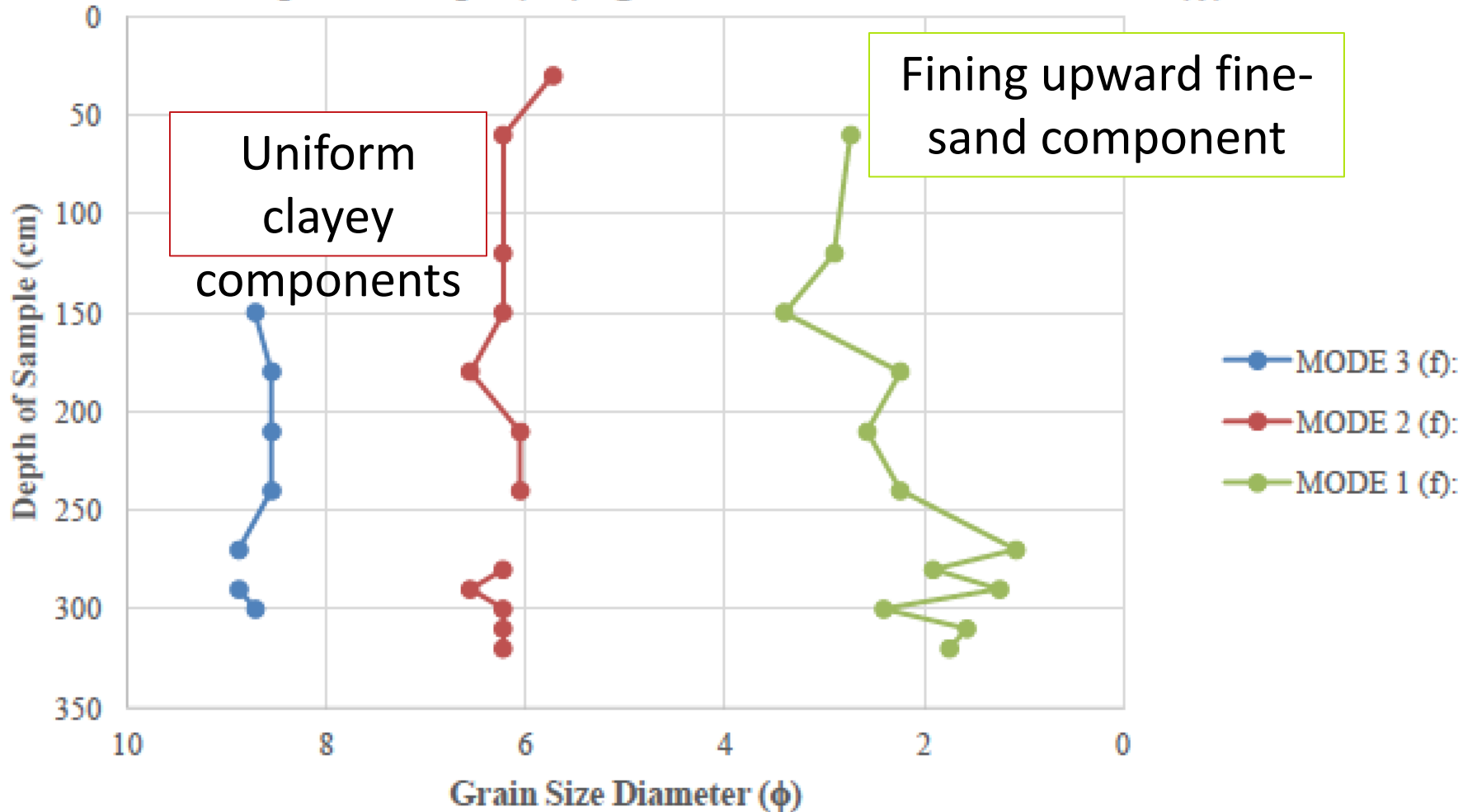


The Bolaven site



Saddle Dam E (SDE 15-A-14)

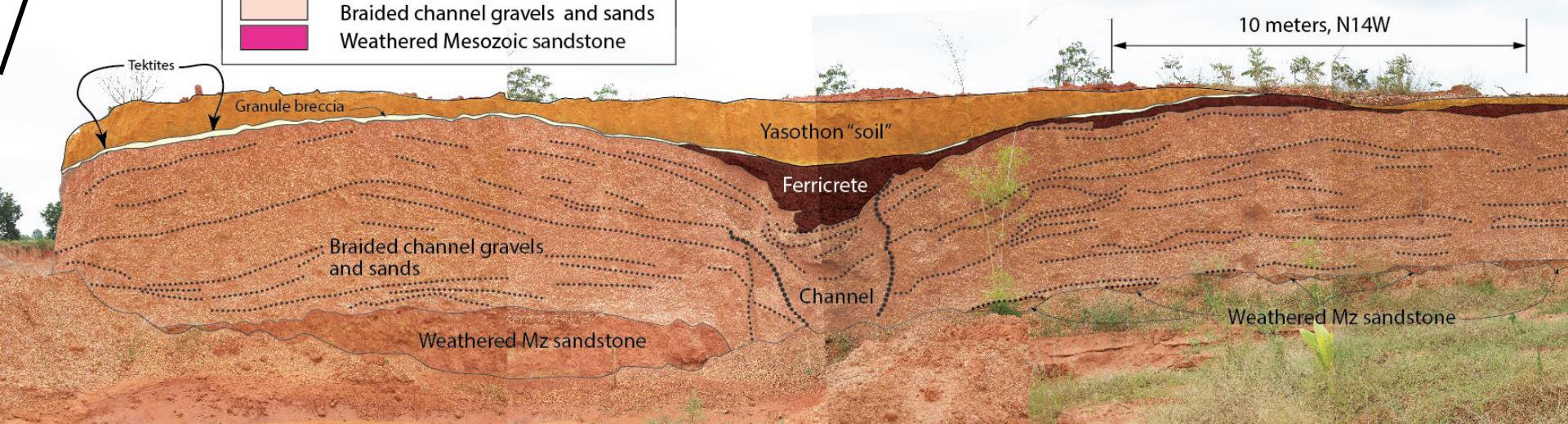
Depth of Sample (cm) against Grain Size Diameter Modes (ϕ)



We interpret these as
primary and weathered



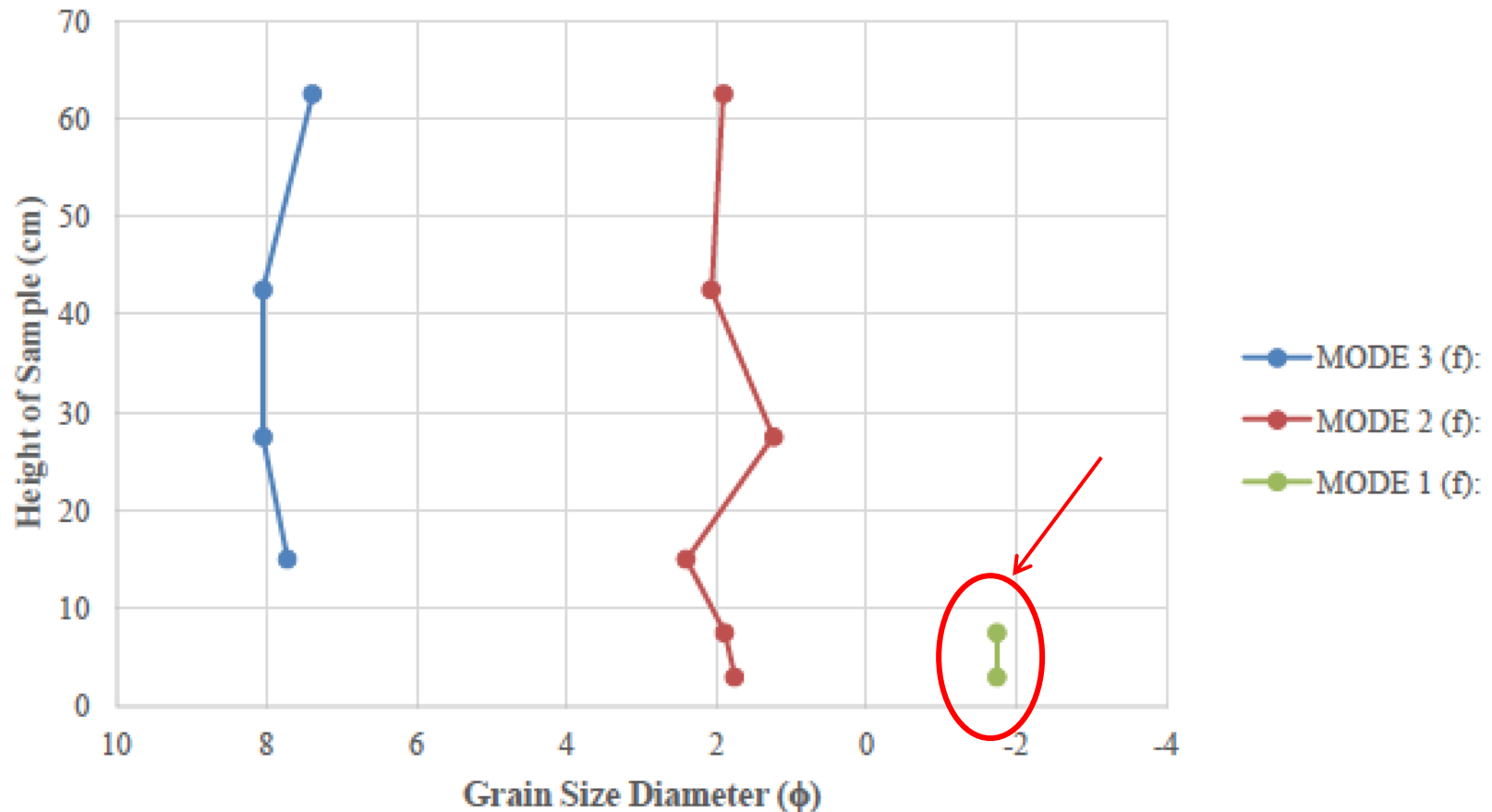
South



At Chaiyaphum there is a course, angular granule layer
in the lower parts of the deposit, immediately atop
the tektite layer



Chaiyaphum Quarry (CPM 15-D-3)
Depth of Sample (cm) against Grain Size Diameter Modes (ϕ)



We tentatively interpret this as part of the catastro-
loess. If so, such coarseness would require
extraordinary turbulence to carry it into the
atmosphere and so far from the source

Targets for future work in eastern Thailand

- The “catastro-loess.” Explore its ...
 - geographical variations relative to impact crater
 - lithology relative to crater and local lithologies
 - grain-size distribution geographically and at each site
 - relationship to fluvial and thanatocenotic assemblages
- The pebbly laterite/tektite layer. Explore its ...
 - geographical variations as a function of distance from impact crater
 - its manner of formation (shock wave or airfall or combination?)

All of these avenues will give us information about the nature of the impact and its interaction with the atmosphere that it punched through

2017 Paleoseismic Workshop in Thailand and Myanmar

- Sponsored by the Earth Observatory and the Department of Mineral Resources
- Organized by
 - ✓ Prof Ray Weldon (U of Oregon) and his colleagues
 - ✓ DMR geologists
- Goals are ...
 - ✓ to promote the paleoseismic training of Thai, Myanmar and other geologists in Southeast Asia
 - ✓ (perhaps) to promote earthquake geodetic and seismic training
 - ✓ to encourage the development of a regionally integrated capacity in earthquake science and its application toward safer, more productive and sustainable Southeast Asian