Wednesday, 13 January 2021

Updates from the Onepoto Drill Core

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Benjamin Läuchli

Project advisers:

Assoc. Prof. Paul Augustinus

Assoc. Prof. Phil Shane

The study site – **Onepoto Basin in the Auckland Volcanic Field** – "The Short Beach"

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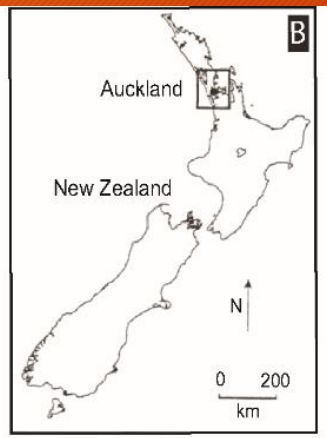

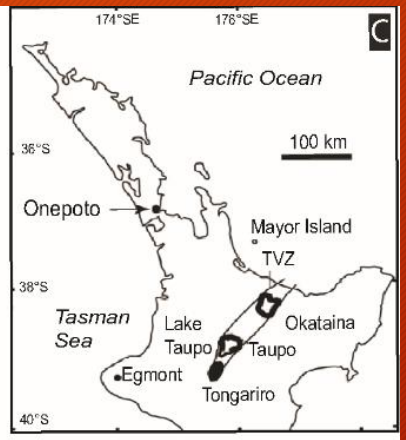

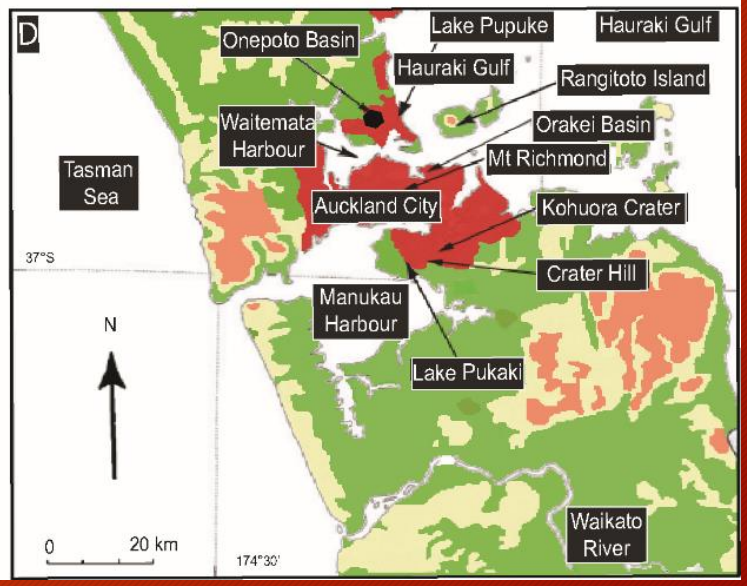

Läuchli et al., in review

Onepoto Basin –

Composite Stratigraphy Development and facies description and comparison to Hägg, J., and Augustinus, 2000/2001

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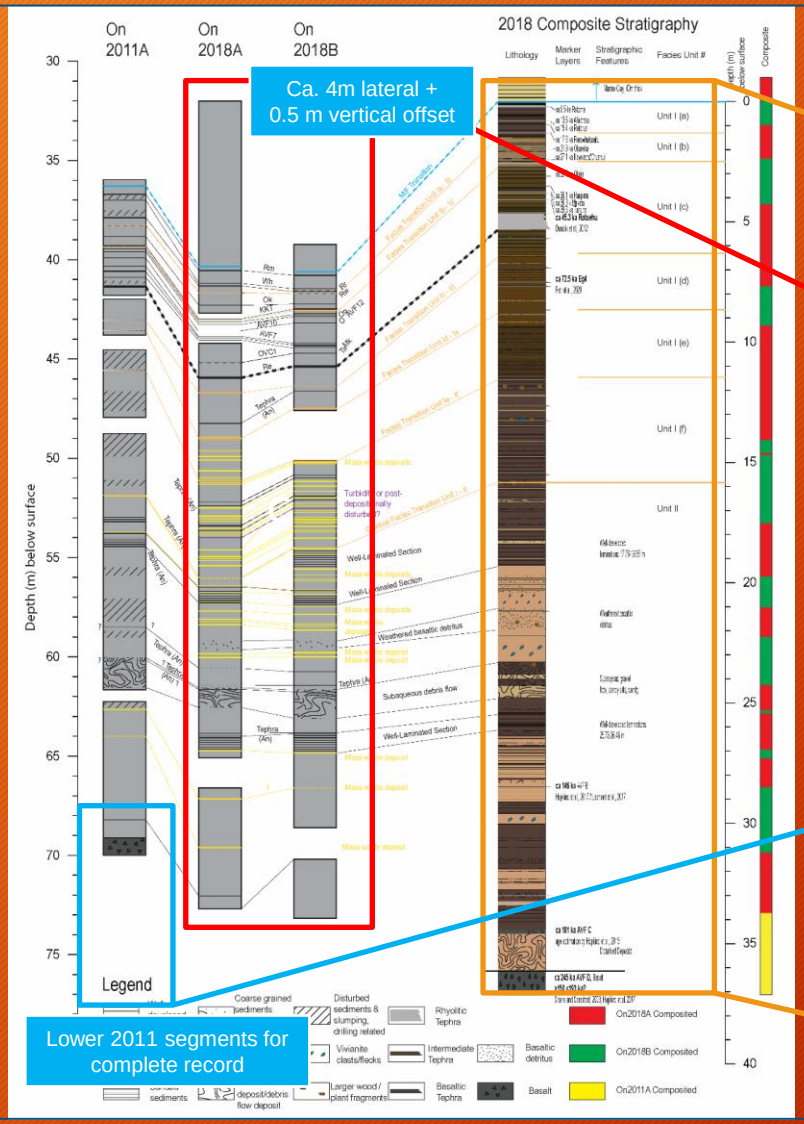

Läuchli et al., in review

Onepoto Basin – *Composite Stratigraphy Development*

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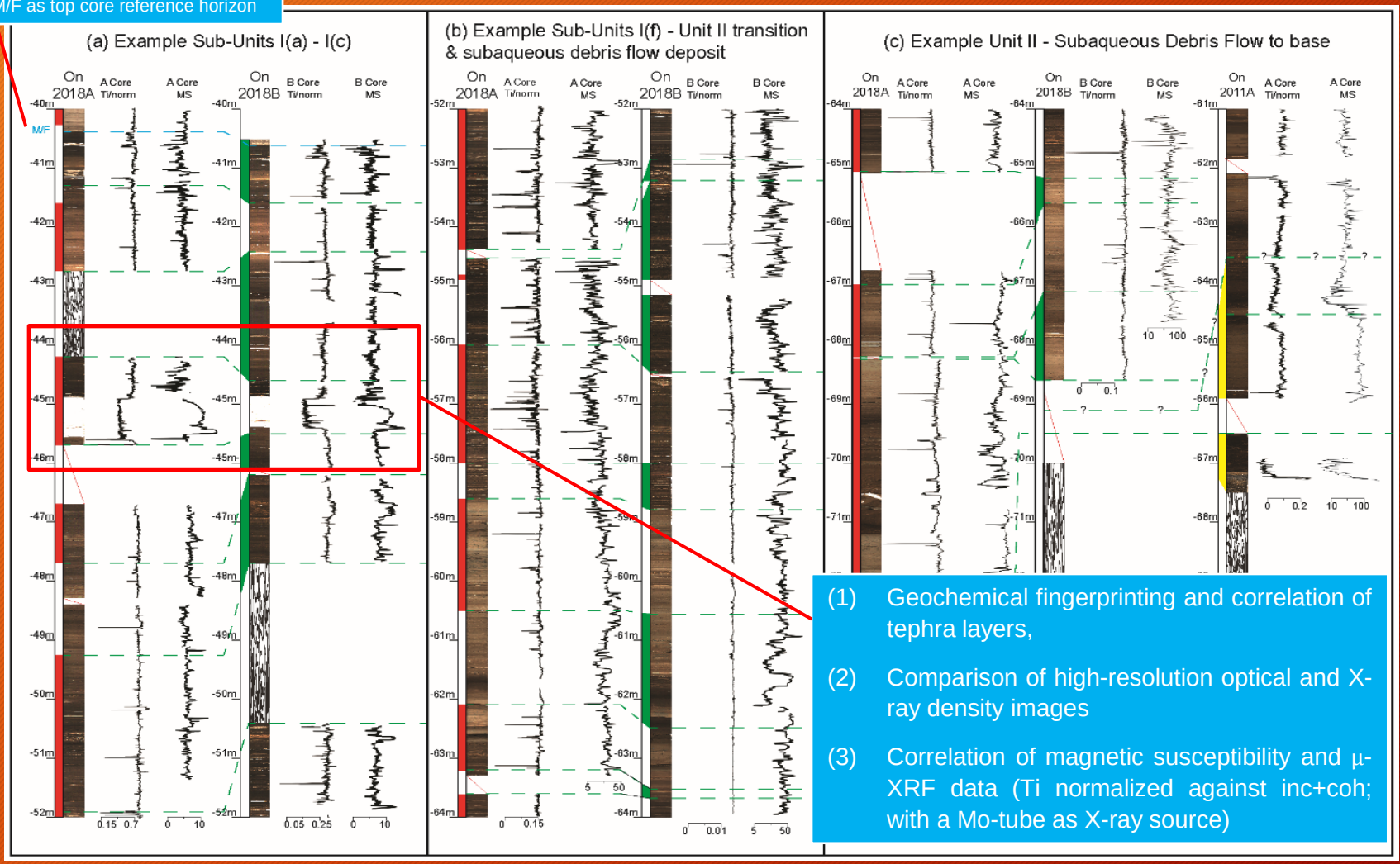
M/F as top core reference horizon



(1) Geochemical fingerprinting and correlation of tephra layers,

(2) Comparison of high-resolution optical and X-ray density images

(3) Correlation of magnetic susceptibility and µ-XRF data (Ti normalized against inc+coh; with a Mo-tube as X-ray source)

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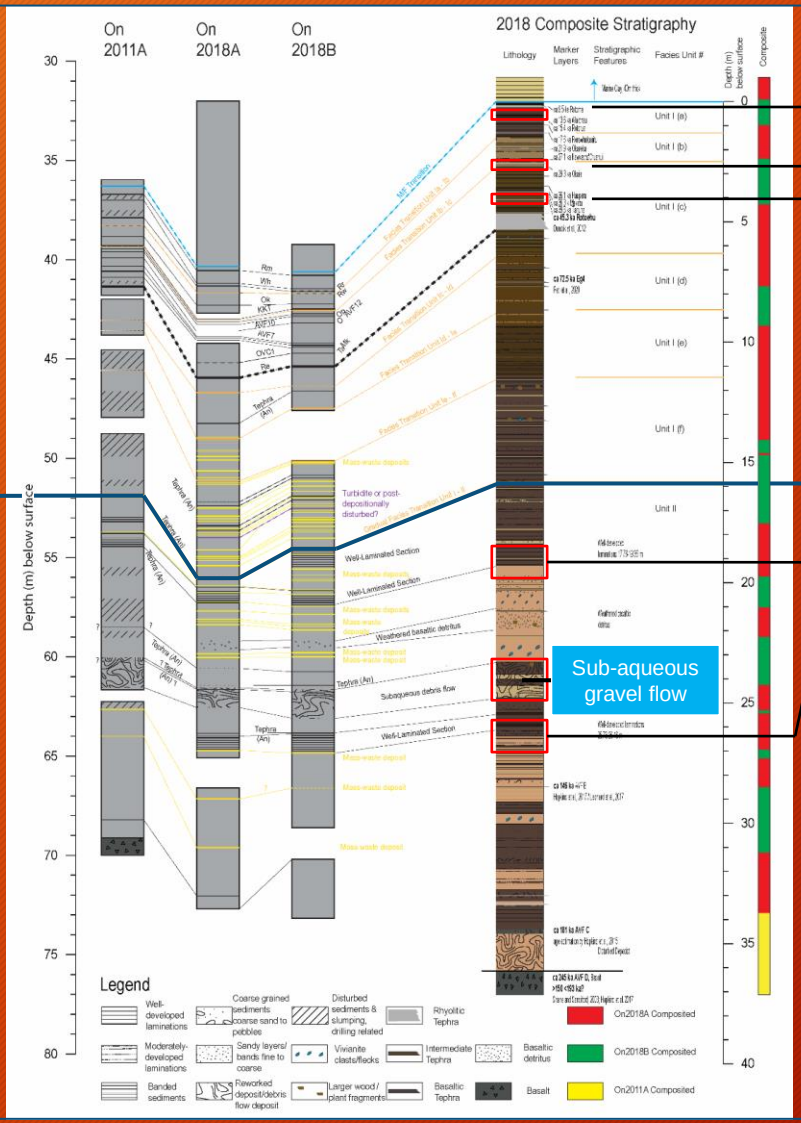
Sediments of **Unit I**:

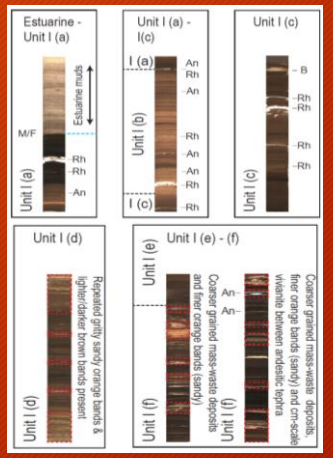
- 6 defined sub-units (a)-(f)
- Apart from sub-units b & c, **very dark brown to black** sediments
- **Well-developed laminations common** but not continuous
- Macroscopic **plant fragments** and **vivianite** flecks present to varying degree

Sediments of **Unit II**:

- commonly very dark grayish brown to dark olive
- **Few fine-scale sedimentary structures**
- **High sand and gravel content** (angular & volcanic origin) – mainly in discrete layers
- Areas **with increased macroscope plant fragments** and **vivianite flecks**



Sections with well-developed laminations



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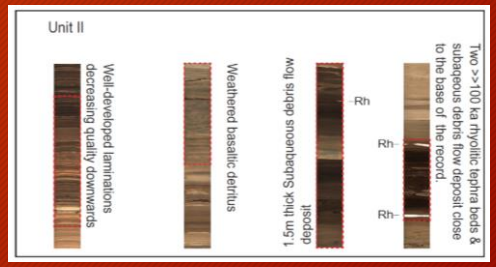

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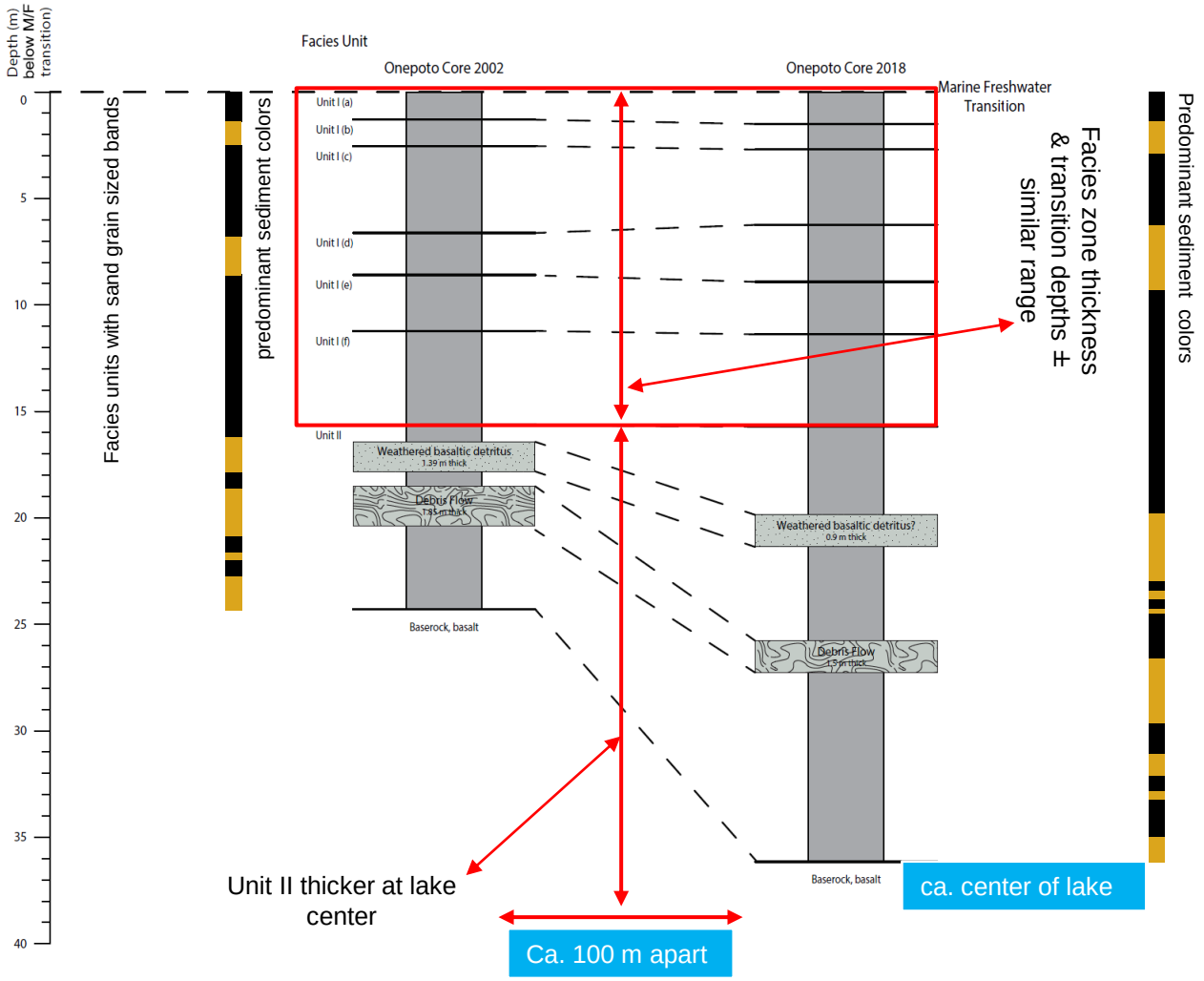

Supported by straight forward correlation of preserved sedimentary features, combined with the µ-XRF and magnetic susceptibility data

Onepoto Basin – *(Preliminary) Bayesian Age Model*

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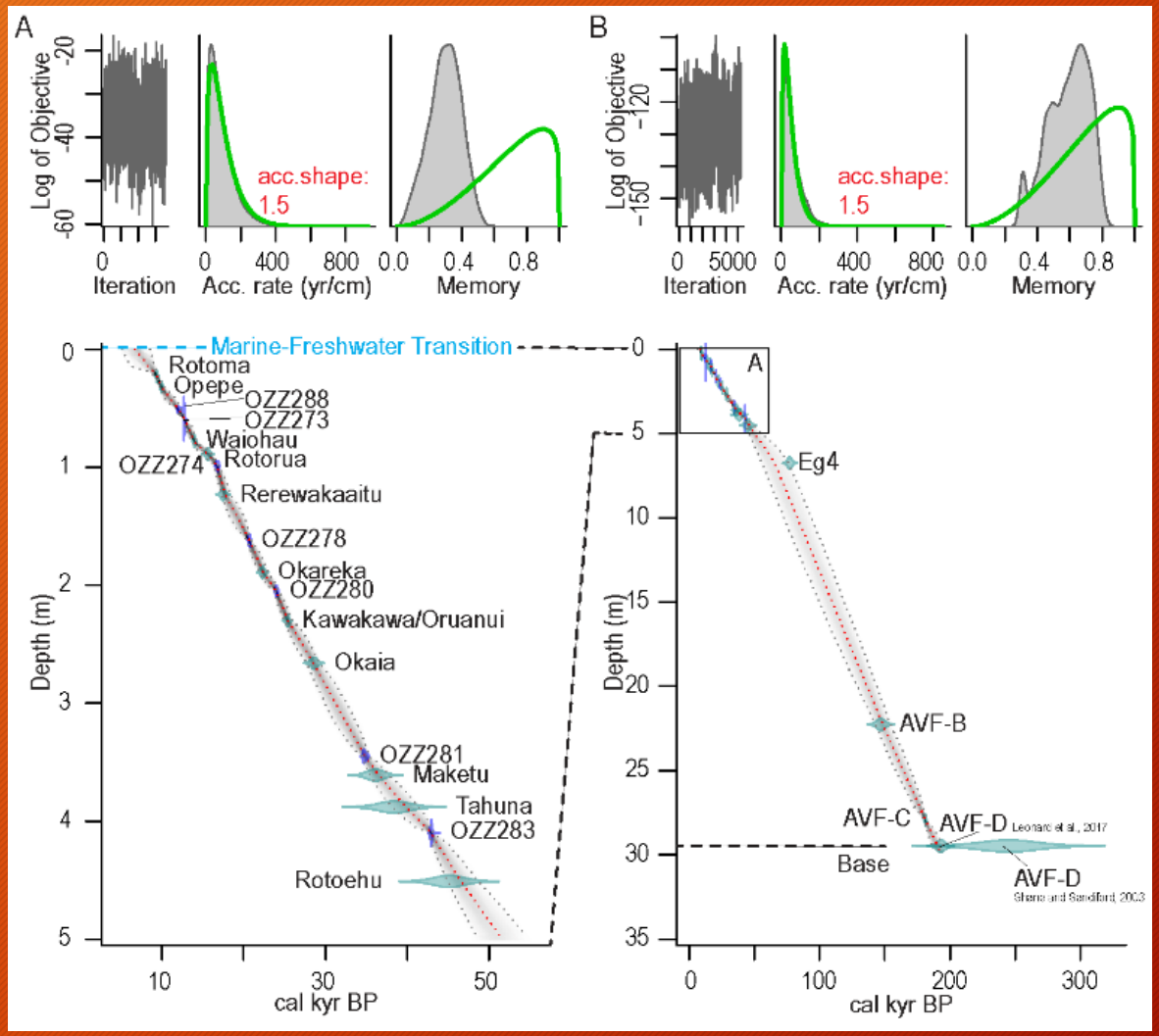
Robust age control guaranteed by 11 rhyolitic tephra layers and 7 ^{14}C samples



Age constraints in **lower part** of the **record momentarily not as well**

Basaltic AVF ejecta and Egmont sourced tephra, however, provide basic age constraints

Reconstruction of ^{10}**Be** fluxes expected to provide framework to establish **robust age model**

Läuchli et al., in review.

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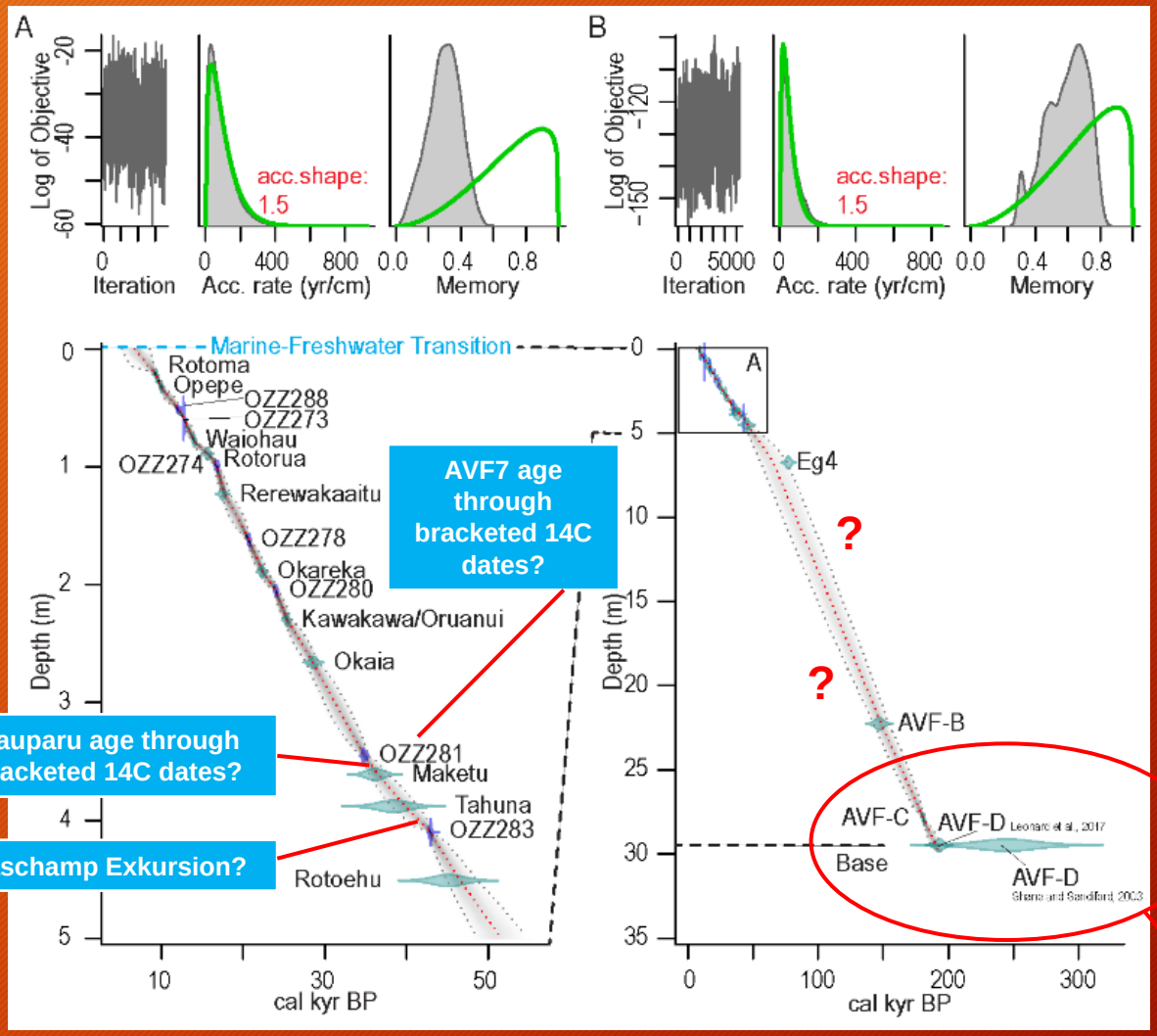

Age constraints in **lower part** of the **record momentarily not as well**

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AVF7 age through bracketed 14C dates?

Hauparu age through bracketed 14C dates?

Laschamp Exkursion?

Basaltic AVF ejecta and Egmont sourced tephra, however, provide basic age constraints

Reconstruction of ^{10}Be fluxes expected to provide framework to establish **robust age model**

Absolut age still subject of debate

Läuchli et al., in review.

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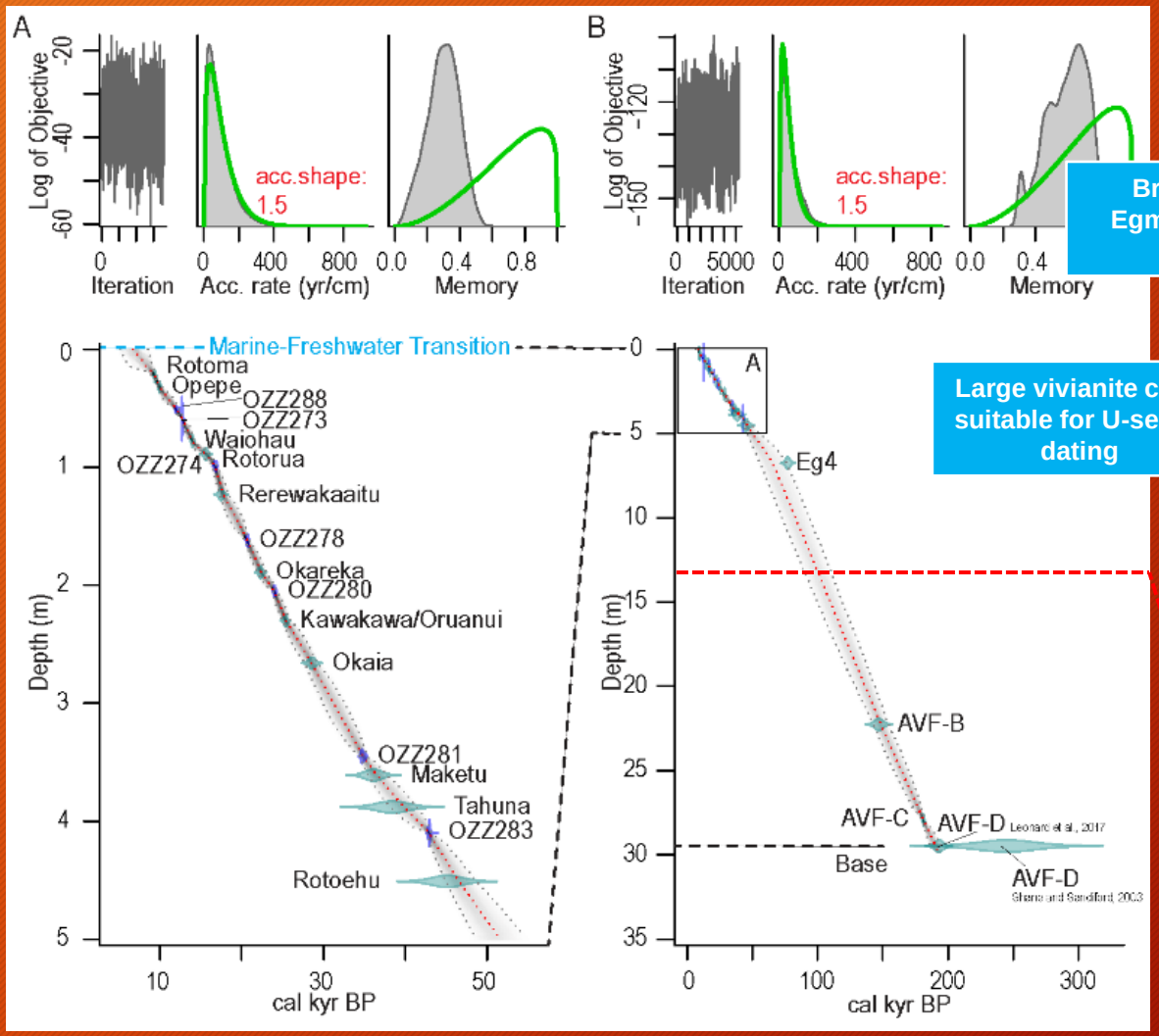

Bracketed by Egmont sourced tephra

Large vivianite clast suitable for U-series dating

Läuchli et al., in review.

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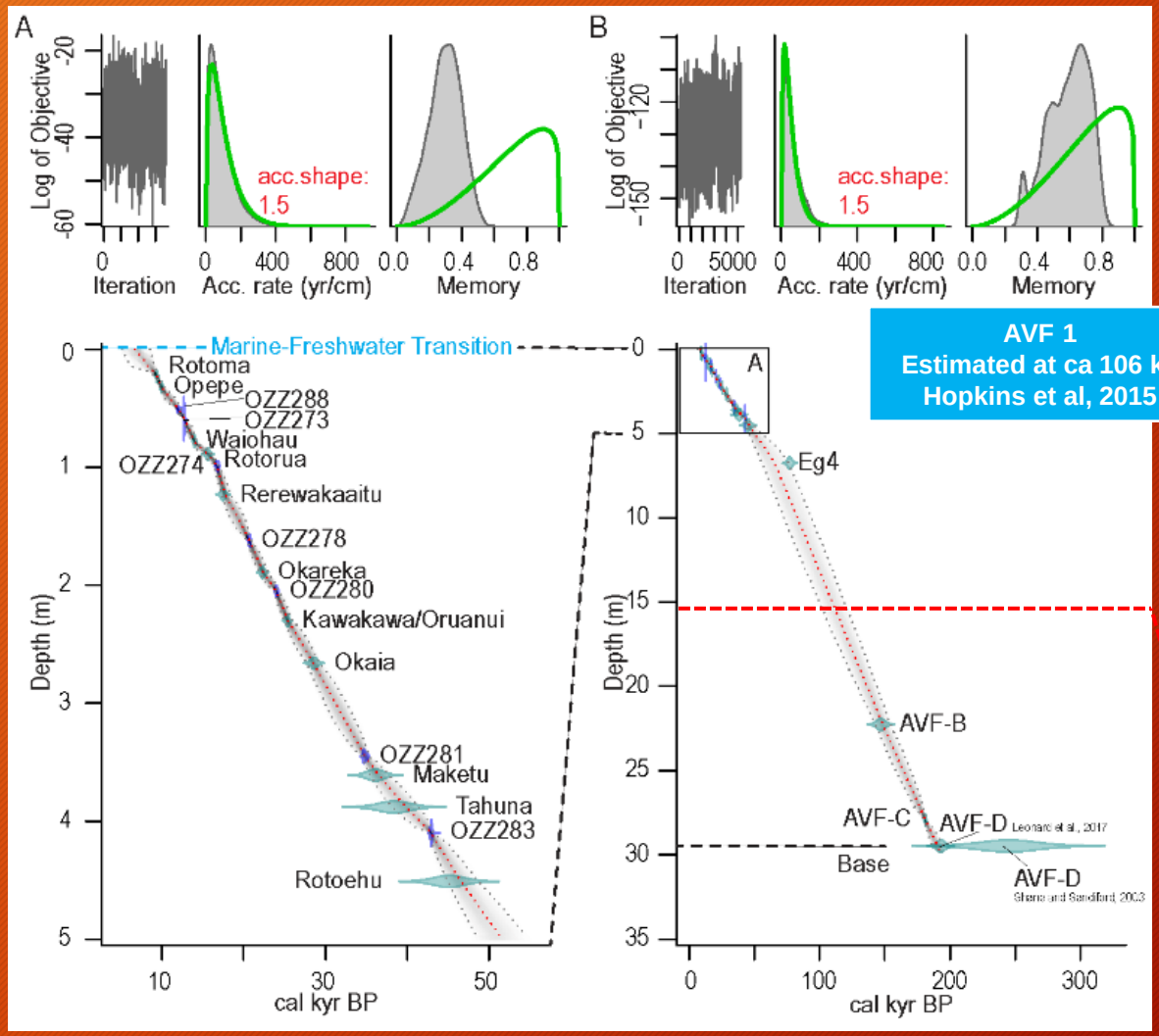
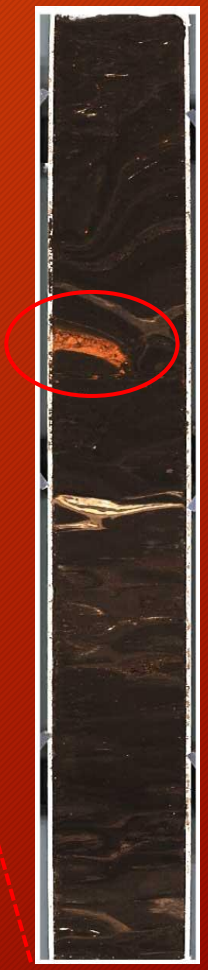


AVF 1
Estimated at ca 106 ka
Hopkins et al, 2015

ca. 15.2 m MIF



Läuchli et al., in review.

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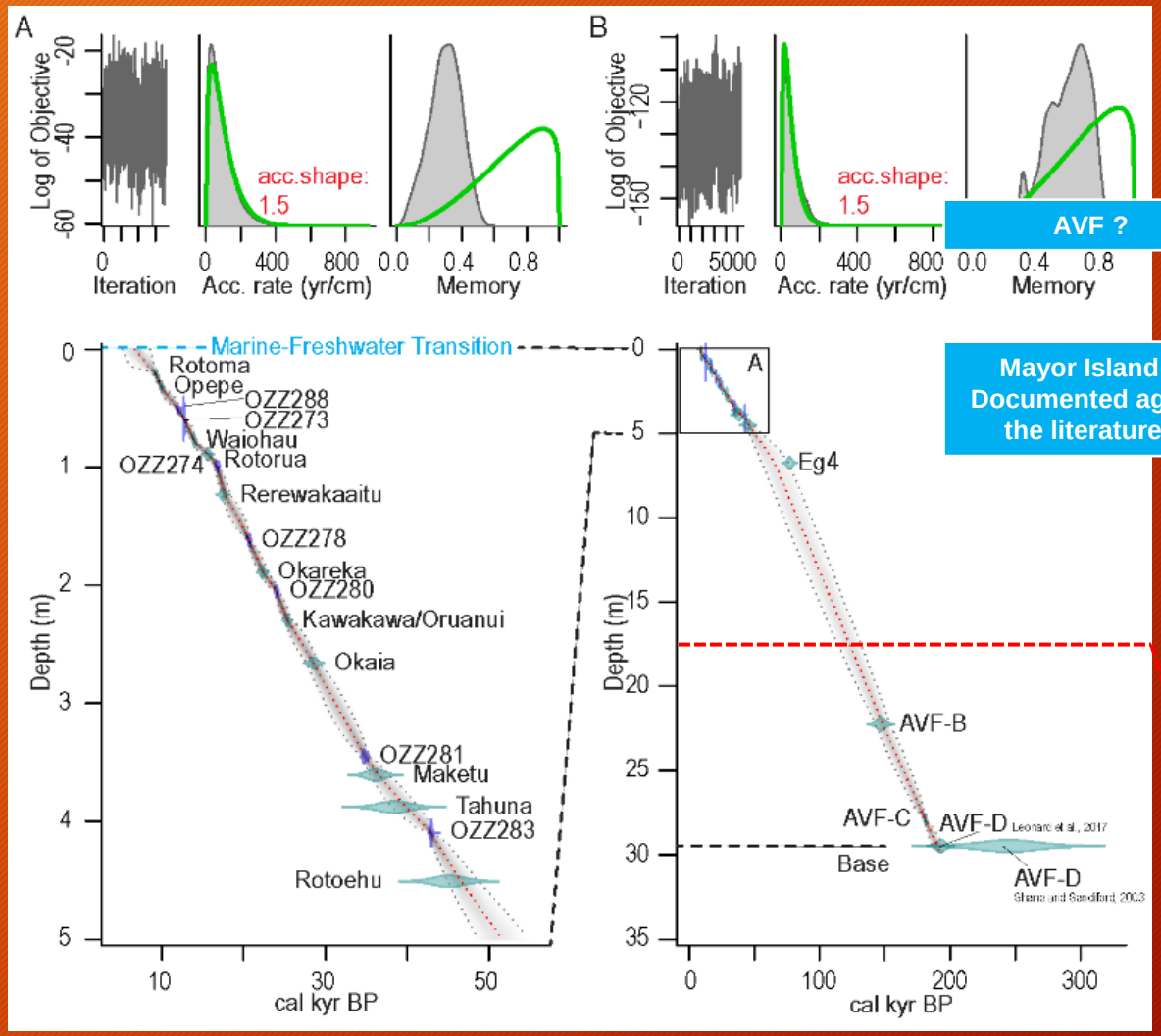

AVF ?

Mayor Island ? Documented age in the literature?

ca. 17.7 m MF

Läuchli et al., in review.

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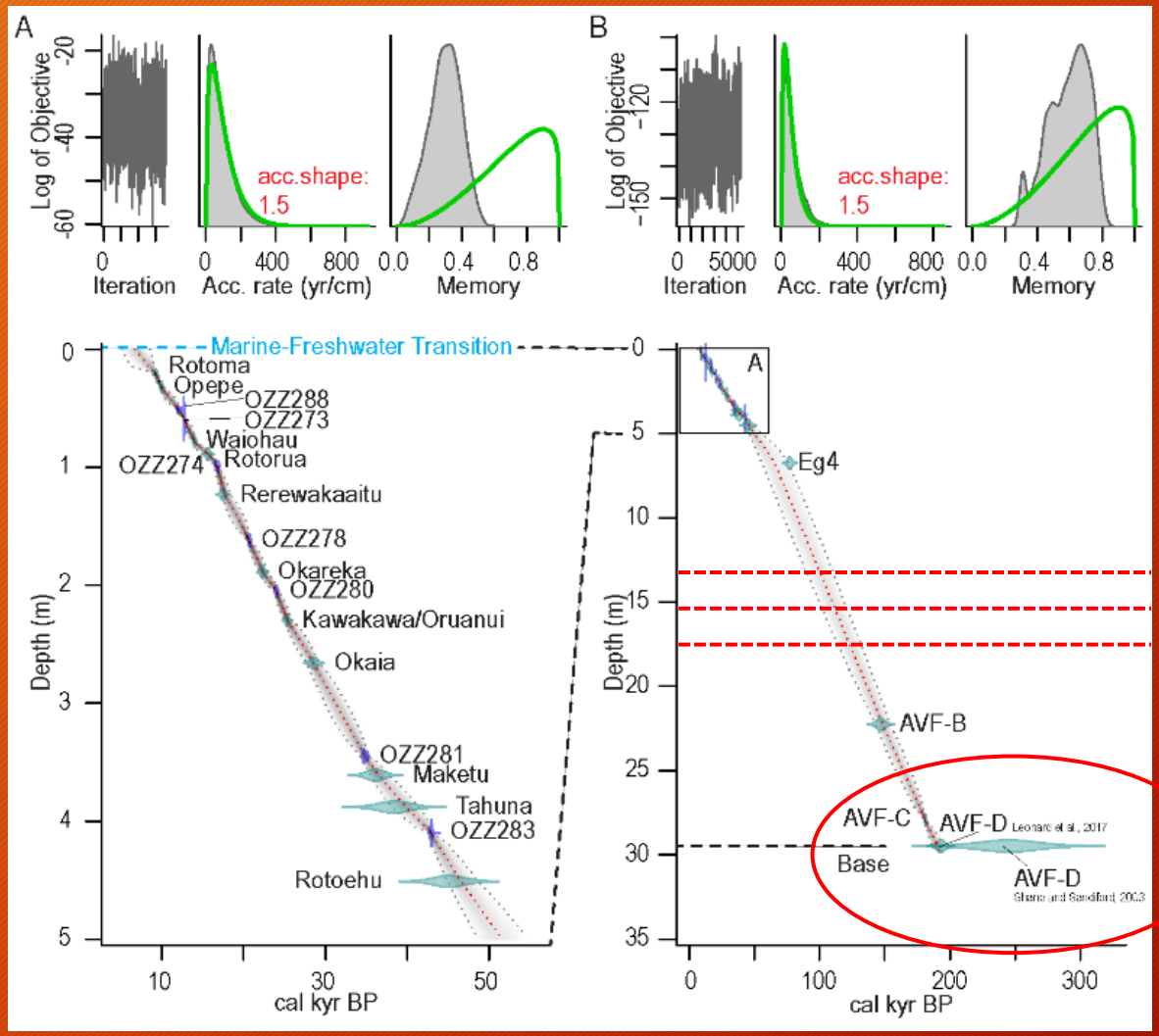

Additional Age Markers?
- **Ca. 100 ka? - vivianite**
- **Ca. 111 vs. 106 ka? – AVF1**
- **Ca. 123.9 ka ? – further AVF + MI tephra**

Absolut age still subject of debate

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Onepoto Basin – Chronology development & beyond

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Outlook / state of the project

- **AMS ^{14}C tephrochronology** have been being applied for …
  - **age dating**, **correlation** to existing **chronologies …**
  - **and establishment of an updated age model for the entire span of sedimentation Onepoto** paleolake (ca. 200-250 ka?)
- Newly acquired **µ -XRF core scanning** of **Onepoto Basin** lake sediments permits reconstruction of regional **environmental** & **sedimentary conditions/events** for the full lake sediment sequence.
  - To add solid creditability to the interpretation of the quantitative µ -XRF data we further analzses for **Loss-on-Ignition** (LOI), **Total Organic Carbon** (TOC), **Total Nitrogen** (TN) and **Total Sulphur** (TS) have been run or are in their final stages.

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Thank you for your attention!

This research is funded through:

MARSDEN FUND
TE PŪTEA RANGAHAU A MARSDEN

1.) The Marsden Contract

THE UNIVERSITY OF AUCKLAND
FACULTY OF SCIENCE
School of Environment

2.) The University of Auckland Doctoral Scholarships

DEVORA

3.) DeVoRa – Determining Volcanic Risks in Auckland

4.) AINSE PGRA for lab work at the ANSTO research facilities in Sydney, Australia

Australian Government | ANSTO

Honorable mentions: Many thanks to Daniela Cerda, Leonie Peti and Quin Asena for their valuable support in the field and lab!