

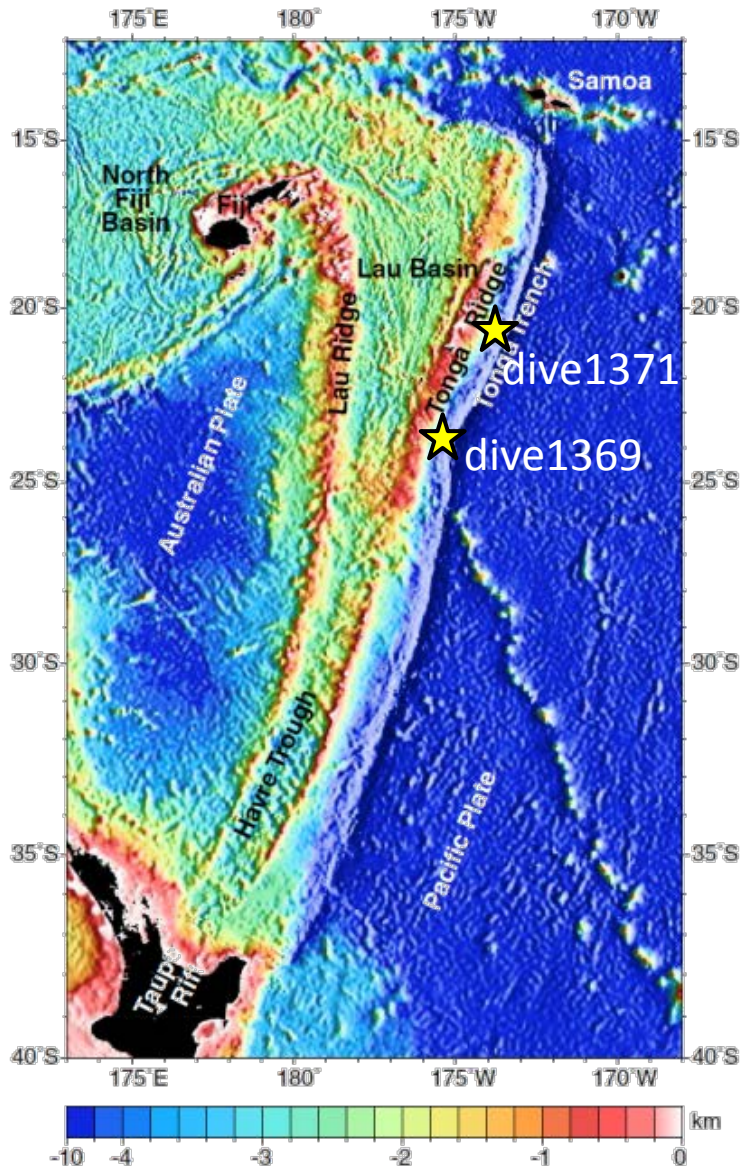
R/V Yokosuka cruise at Tonga Trench

Oct. 6-21, 2013

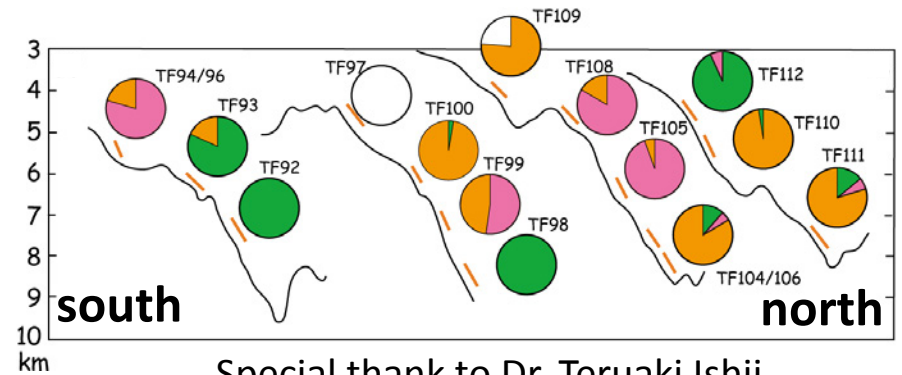
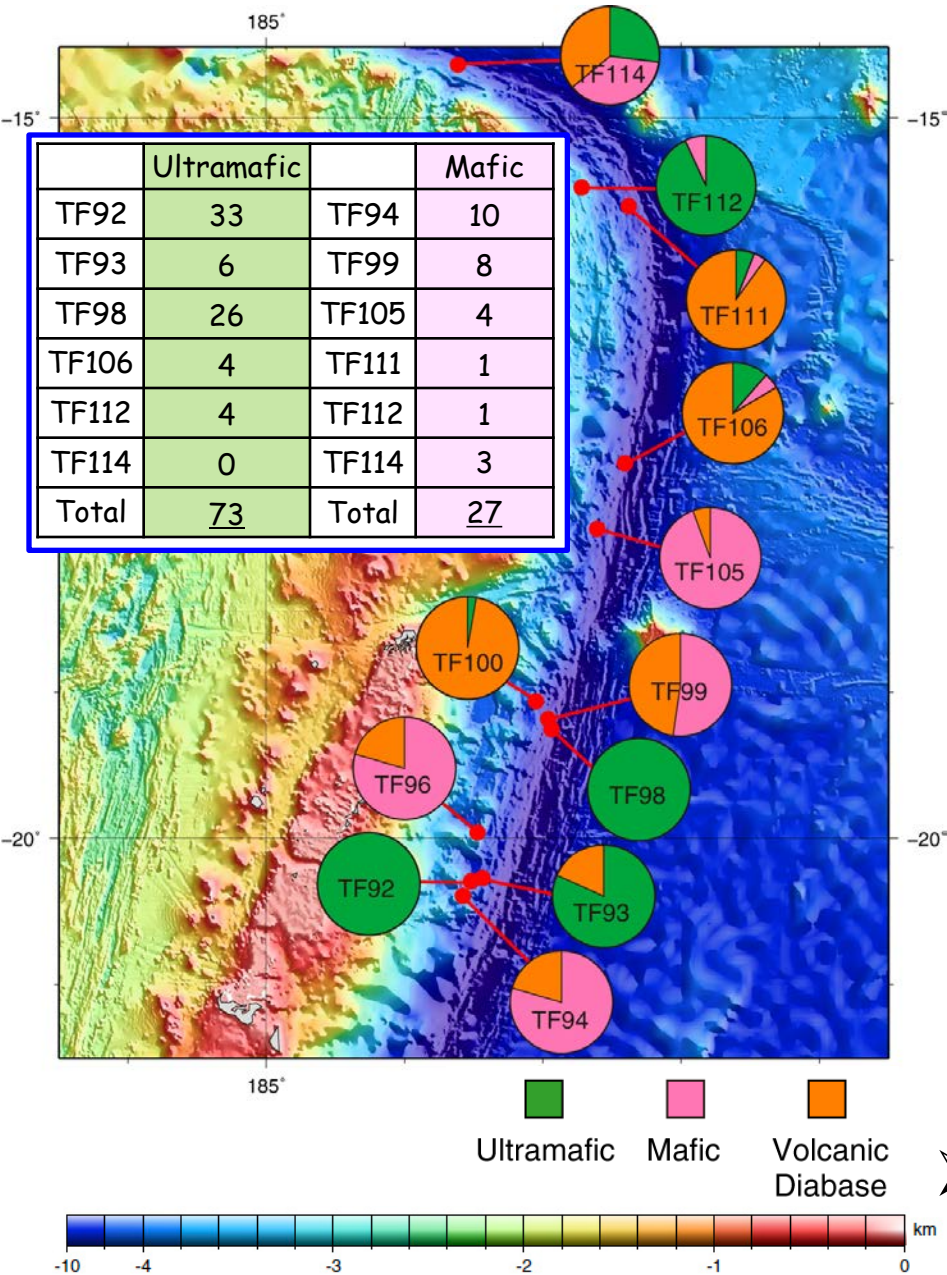
Osamu Ishizuka (Geological Survey of Japan)

Horizon Deep: 10,866m

The second deepest ocean
in the world



Rocks



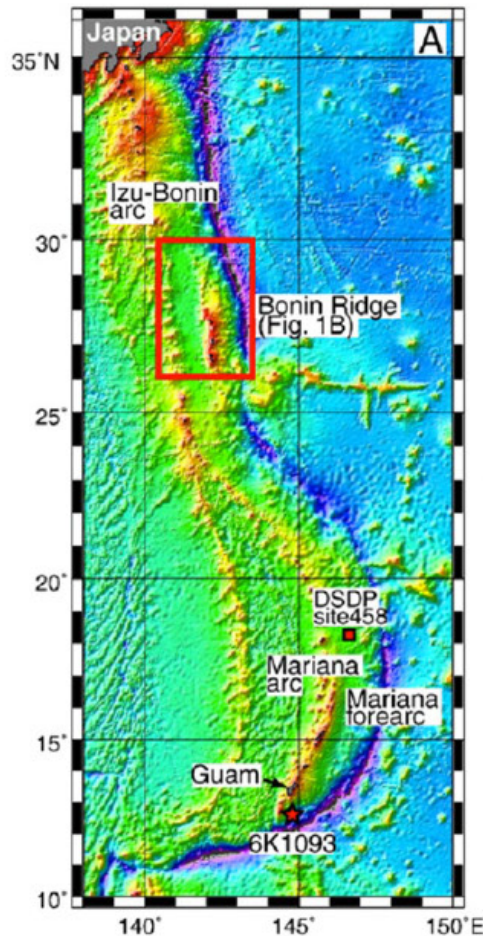
Special thank to Dr. Teruaki Ishii

Boomerang Leg8 aboard R/V Melville (1996)



➤ Depth 4136m ~ 9371m

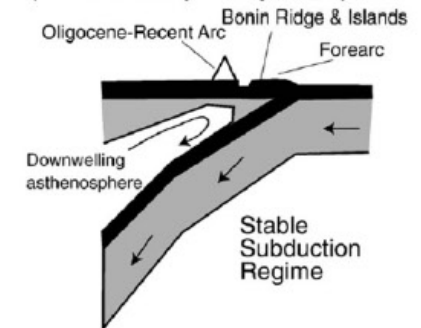
FAB: Forearc Basalt (MORB-like tholeiitic basalt) the oldest (~52Ma) volcanic rocks in IBM



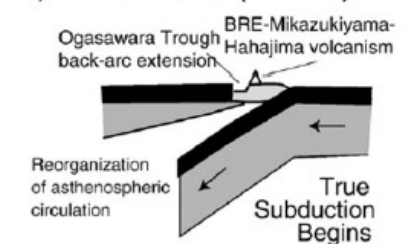
Lithology		age (Ma)	approximate depth (m)
arc tholeiites and calc-alkaline rocks		37-44	
high-Mg andesite		44-45	subaerially based
boninite andesite (and their differentiates)		44-48	
basalt (FAB)	pillow lava hyaloclastite	50-52	5500-7600
	sheeted dyke		6300
gabbro/Mesozoic basalt	gabbro	50-52	6780
	basalt		
peridotite			

Ishizuka et al. (2011, EPSL)

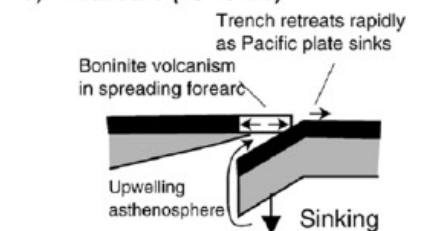
c) *Mature Arc (41 Ma-present)*



b) *Transitional arc (45-41 Ma)*



a) *Infant arc (48-45 Ma)*

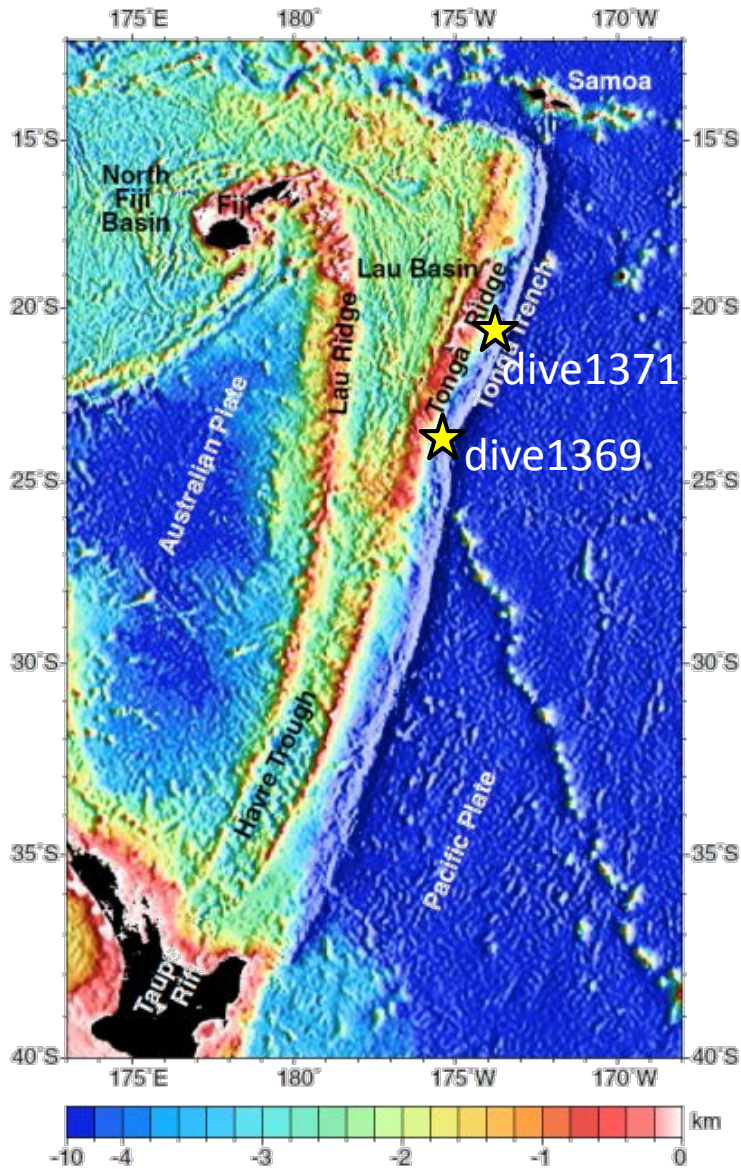


FAB has been firstly reported by Reagan et al. (2010, G3).

Ishizuka et al. (2006, EPSL)

YK13-10 cruise at Tonga Trench

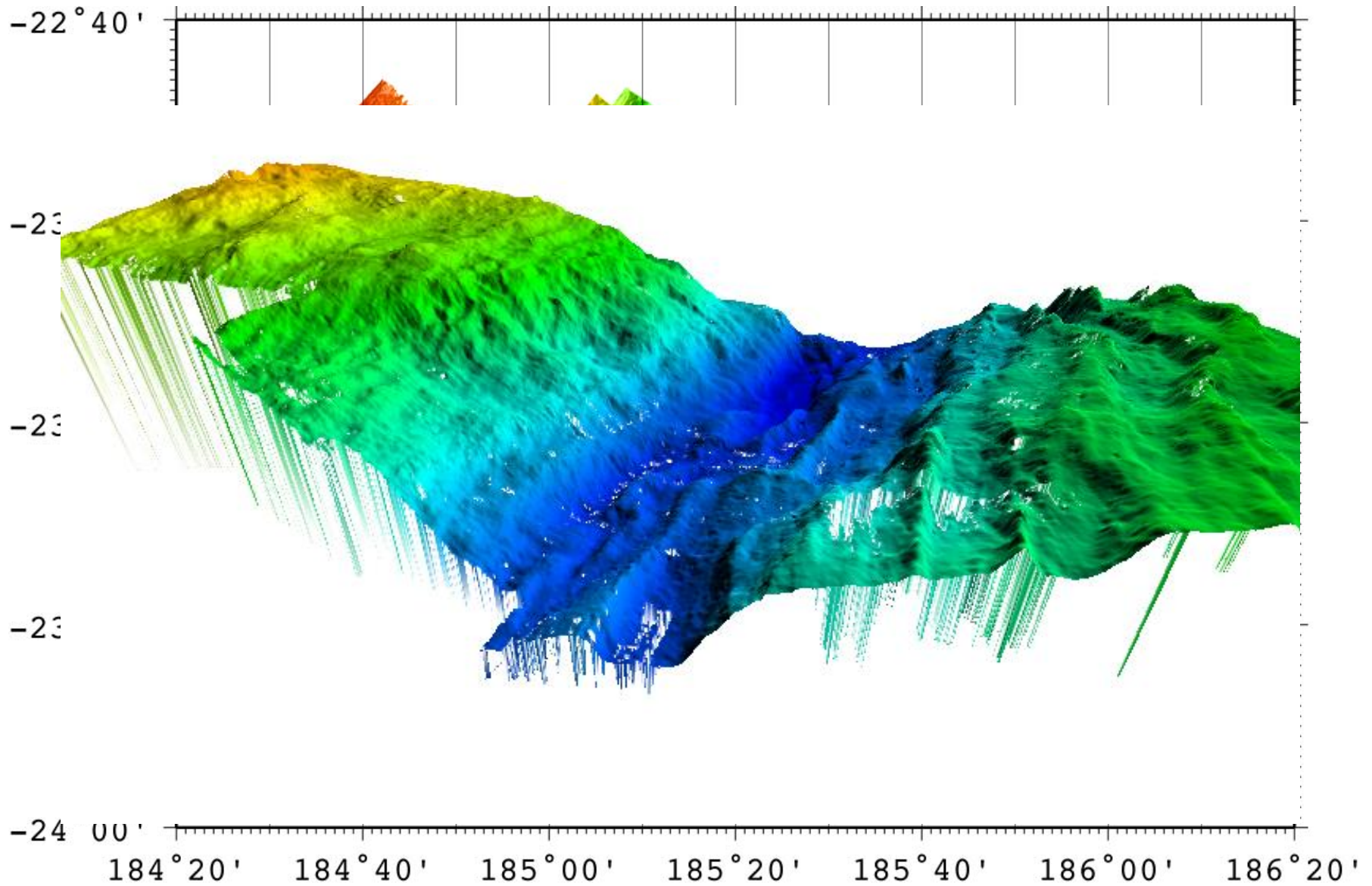
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PI: Katsuyoshi Michibayashi (Shizuoka University)

- 4 dives given, but only 2 dives done.
- Dive 1369 near Horizon Deep observed sediments.
- Dive 1371 north of the Deep found igneous section.

Horizon Deep

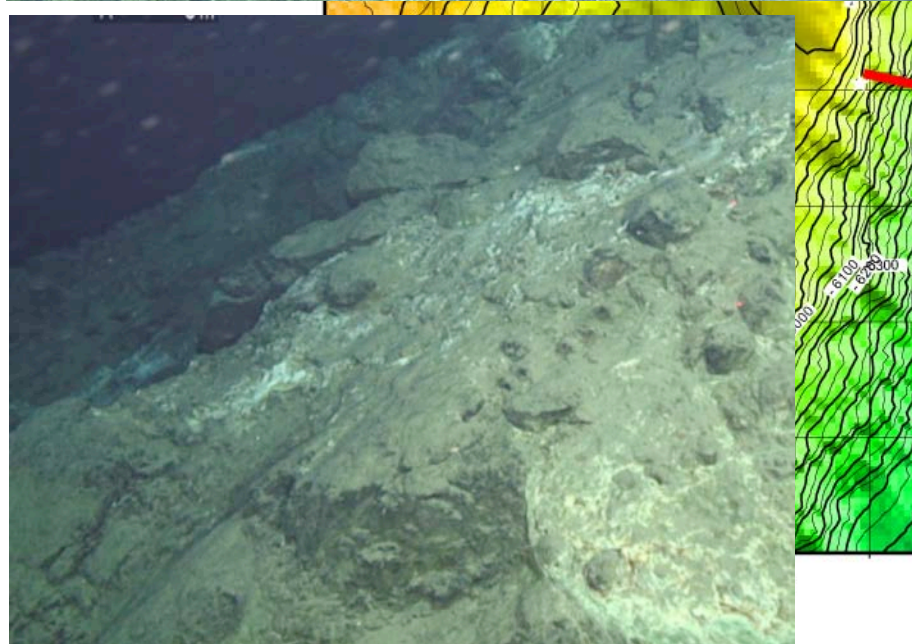


6KDive1371: 6465-5917 m



Lower section

- basaltic pillow lava
hyaloclastite
- dolerite
- one andesite



6K Dive 1371: 6465-5917 m



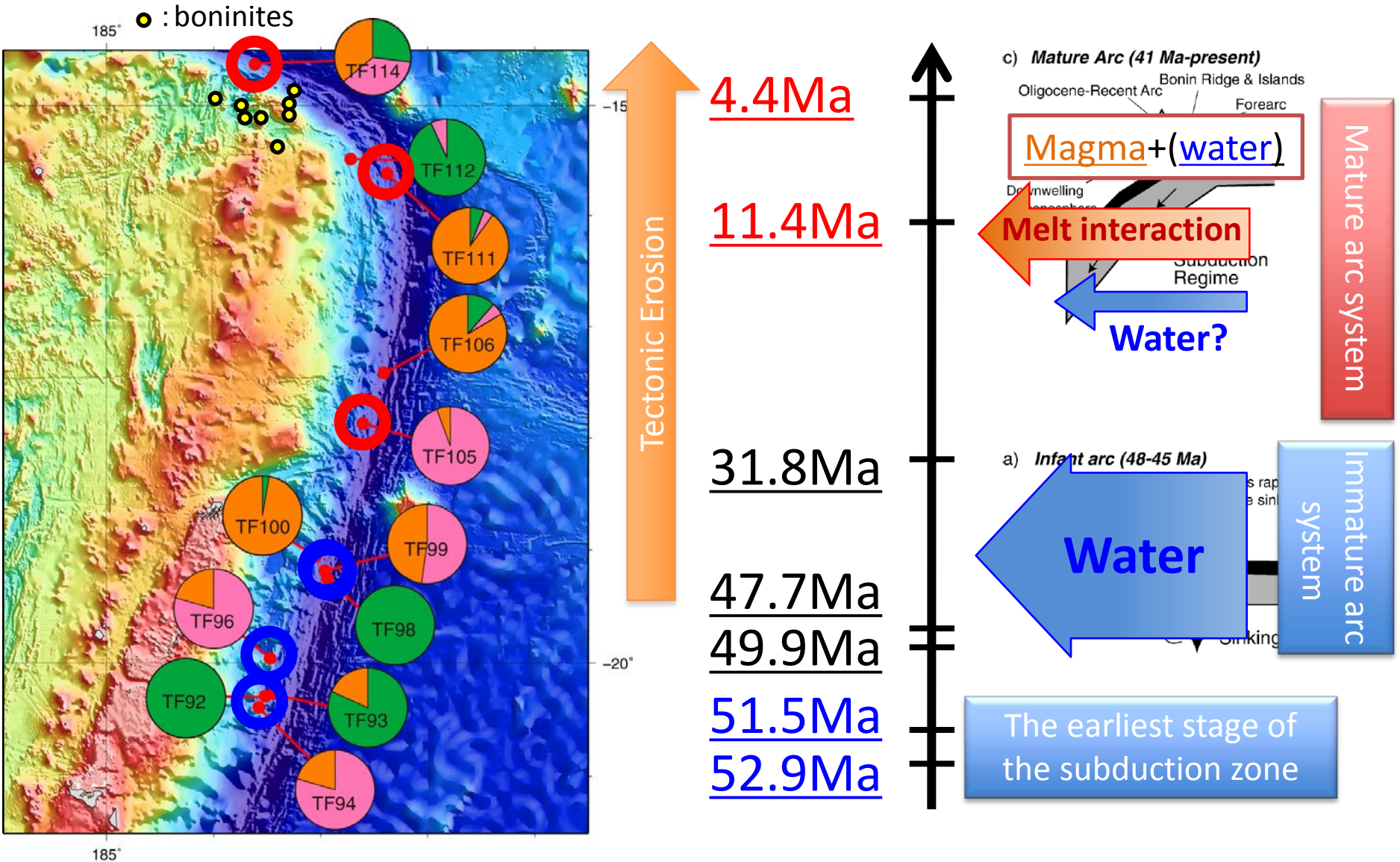
Upper section

- harzburgite
- dunite
- pyroxenite

But none of them are
from outcrop.....



Tonga Trench reveals the subduction evolution



Trigger to start melting in mantle

