Using the drillship to determine subduction zone inputs

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Phase diagram to predict H$_2$O loss during subduction

After van Keken et al. (2011) JGR

Rheology, fore-arc structure and fault slip

After Gutscher et al. (2001) Geology

Tracer for the dynamics of mantle wedge flow

After Hoernle et al. (2008) Nature


Plank (2013) Treatise on Geochemistry

What about subducting oceanic crust and mantle serpentinitite?
Marion Carpentier
ODP 888, 1027
Nitinat Fan
Juvenile terranes
(300-400 m bsmt, JdF hydro
IODP 301 & 327)

Julie Prytulak
DSDP 174
Astoria Fan
Proterozoic glacial outburst
(no basement)

Emily Johnson
ODP 1020
Gorda pelagic sediments
(tagged basement)
Strong geochemical gradient in sediment along strike?

How much sediment subducts?
What was the margin like 3 m.y. ago?
178 500 m sediments
< 1 m basalt

887 886
70 m brown clay and diatom ooze
< 1 m basalt

Amlia FZ

Aleutians

IODP 341
May 2013

780 sed
17 m bas

Surveyor Fan

70 m brown clay and diatom ooze
< 1 m basalt

Patton-Murray seamounts

Zodiac Fan

Western Aleutians -
Little recycled sediment
Oceanic crust?

Yogodzinski et al. (2010)
500 m carbonates to Cretaceous
What’s underneath??

from Davy et al. (2008) G3