This is not an important geodynamic feature
The WHOLE arc story: Westward culmination of along-strike variation
Arc-arc collision

Arc translation

Arc building

Arc

Plate boundary
Begin slab tear

Collision

Arc decoupled from Pacific plate

End subaerial volcanism

Kamchatka mainland
Komandorsky Basin
Cape Kamchatka Peninsula Collision Zone
Korsak

1923 M8.5
1952 M9
80 km/Myr

Kamchatka SL

PACIFIC

RUSSIA

NORTH AMERICAN PLATE

ALASKA

40°N

50°N

55°N

150°E

160°E

170°E

Collision
Begin slab tear

End subaerial volcanism

Slab melting, abrasion, rollback

Arc decoupled from Pacific plate

Collision

Extreme magma flux

Collision

Begin slab tear

End subaerial volcanism
Slab melting, abrasion, rollback
Arc decoupled from Pacific plate
Begin slab tear
End subaerial volcanism
Collision
Extreme magma flux
Timing of subduction shutdown
Rifting
Steps towards bilateral collaboration in northern Pacific geohazards

- August 2011: NSF/USGS and RAS establish working groups to identify areas of common interest.
- September 2011: Alaska planning for GeoPRISMS
- October 2011: Russian and American groups submit fact sheets to respective governments.
- November 2011: Bilateral Presidential Commission on Science and Technology (Holdren and Fursenko) considers establishment of geohazard subworking group or agreement.
Russian group at MSU 22/08/2011, left to right:
Gennady Sobolev
President, Seismological Council, RAS
Alexander A. Soloviev
Director, International Institute of Earthquake Prediction Theory and Mathematical Geophysics, RAS
Oleg Melnik
Head, Hydrodynamics Laboratory, Institute of Mechanics, RAS
Viacheslav K. Gusiakov
Head, Tsunami Laboratory, Institute of Computational Mathematics and Mathematical Geophysics, RAS, Novosibirsk

Not shown:
Alik Ismail-Zadeh
Secretary General, IUGG
Evgeny Gordeev
Director, Institute of Volcanology and Seismology, RAS

Torn Pacific slab: (l) cartoon of showing mantle flow; (m) plan view at 150 km showing slab (blue) absent between Attu and Kamchatka; (r) 3-D perspective showing asthenosphere (red) rising into slab tear.
Aleutian Arc colliding with Kamchatka: Investigation of faults\textsuperscript{3} records accretion of western-most Aleutian "island" (hypothesis) to Kamchatka at Kamchatsky Cape. Westward through the American and Russian Aleutian islands, coupling is transferred from Bering to Pacific plates, resulting in clockwise block rotation. Two similar capes to the south suggest the junction may be migrating north and may be the earliest Aleutian arc record.

Major risk mitigation project in P-K: (l) Old apartment building with insufficient external reinforcement; (m) new reinforcement in progress; (r) completed.
Tsunamis:
(1) Rump for recent tsunami for central portion of east coast of Kamchatka; (r) Number of tsunamis found per millennia with runups of more than 5 m. Vertical lines with letter labels denote tephra time markers.

Ash-producing eruptions:
Nearly continuous production of ash at Karynsky (l, JKASP field trip) and Shiveluch, and episodic production at Bezymianny, Kizimen, and Kluchevskoi, make Kamchatka an ideal “natural laboratory” to investigate ash plumes and test dispersion and fallout models.

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<td>Volcanic eruptions</td>
<td>History in terms of size, chemistry, explosivity, recurrence, ash distribution</td>
<td>Seismic, GPS, gas, radar; many volcanoes in Aleutians lack any instrumentation</td>
<td>Improve short-term eruption forecasting; improve models for explosive eruption including “source term”, ash dispersion, and fallout</td>
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