

Geologic Aspects of the M = 8.8 February 27, 2010 Chile Earthquake

Keith Kelson, Fugro William Lettis & Assoc.; David Frost, Georgia Tech;
Christian Ledezma, Pontificia Universidad Catolica de Chile; Robb Moss, Calif.
Polytechnic Univ. SLO; Nicholas Sitar, UC Berkeley; Rob Witter, DOGAMI

Pedro Arduino, Univ. of Washington; Scott Ashford, Oregon State Univ.; Dominic Assimaki,
Georgia Tech; Jonathan Bray, UC Berkeley; R. Boroschek, Universidad de Chile; Gabriel
Candia, UC Berkeley; Terry Eldridge, Golder & Assoc.; Aldo Faúndez, Servicio de Salud
Arauco; Tara Hutchinson, UC San Diego; Laurie Johnson, Laurie Johnson Consulting;
Katherine Jones, UC Berkeley; Rob Kayen, US Geological Survey; Gonzalo Montalva,
Universidad de Concepcion; Sebastian Maureira, Universidad de Chile; George Mylonakis,
Univ. of Patras; Scott Olson, Univ. of Illinois; Kyle Rollins, Brigham Young Univ.; Jonathan
Stewart, UC Los Angeles; Alfredo Urzua, Boston College; & Ramon Verdugo, Universidad de
Chile; Chilean Air Force



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Earthquake

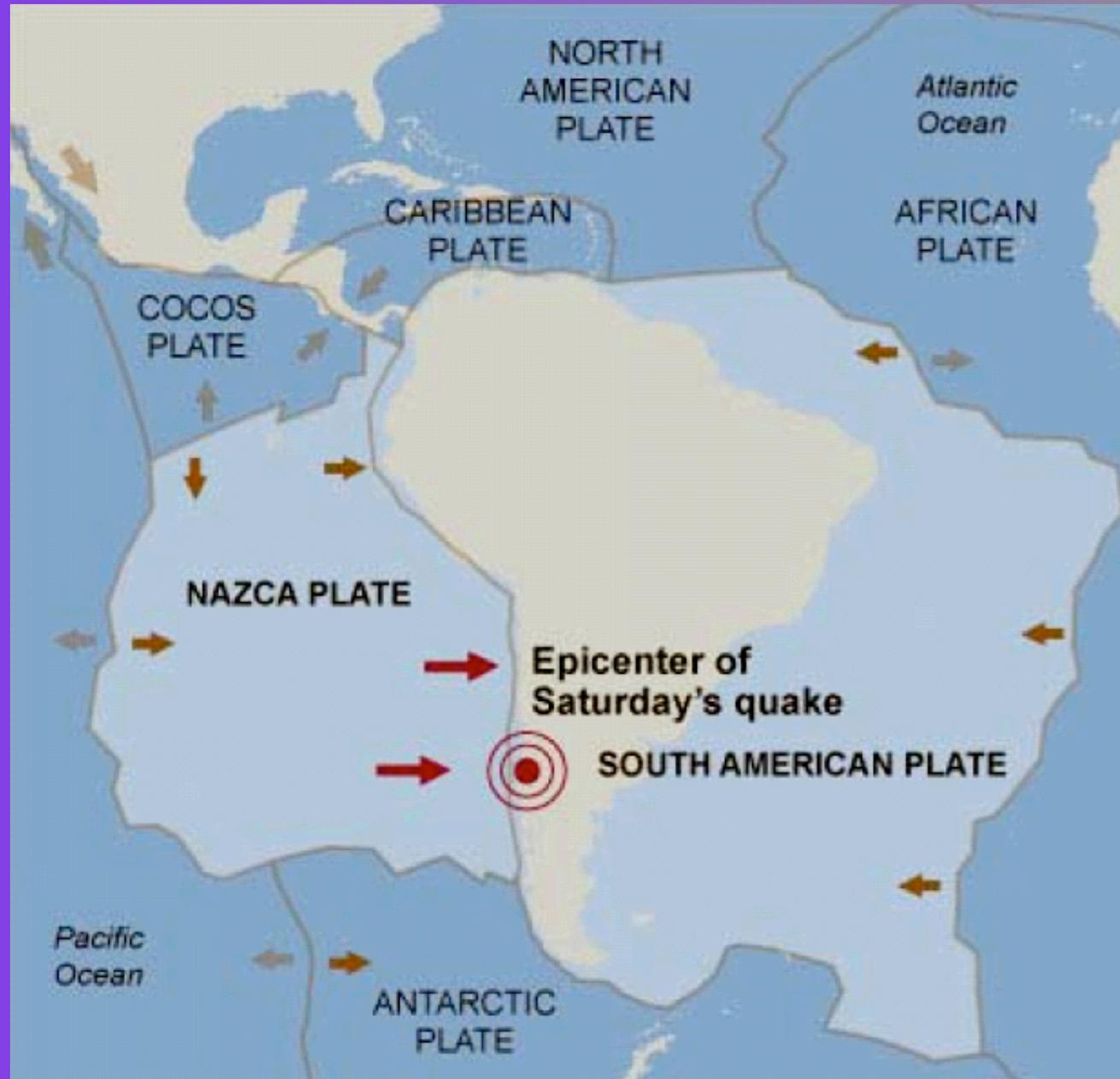
Damage Extent

Regional Geology

Uplift / Subsidence

Tsunami

Mw8.8 at a Depth of 35km



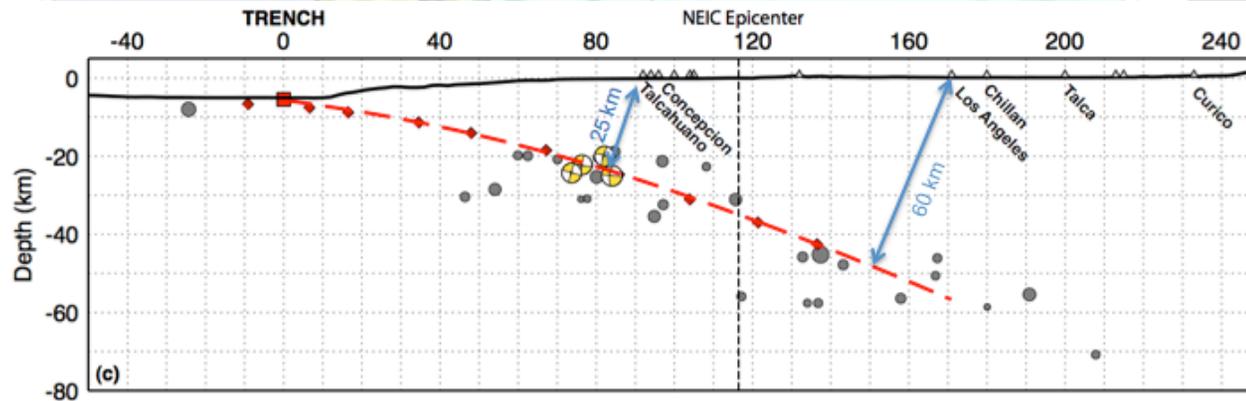
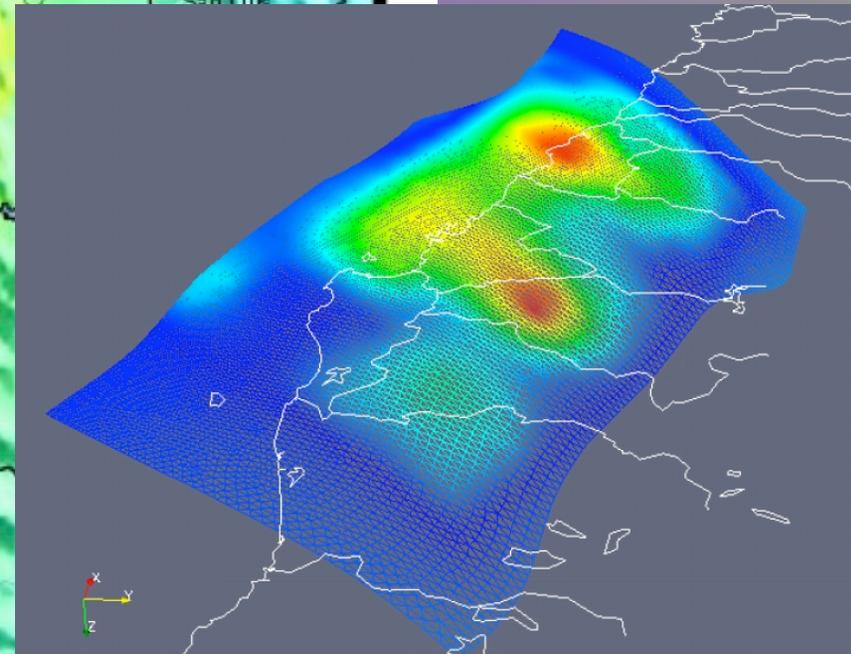
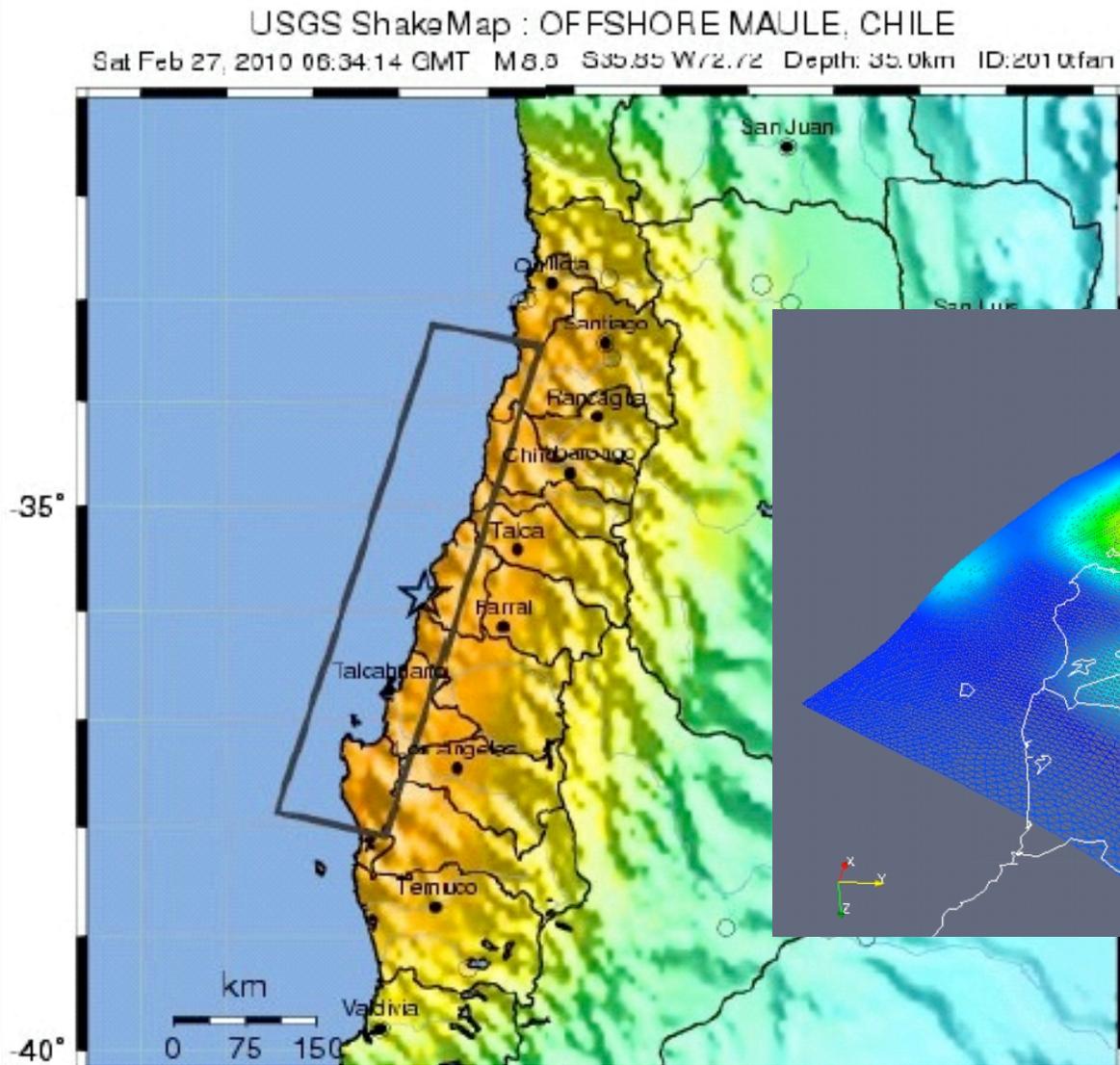
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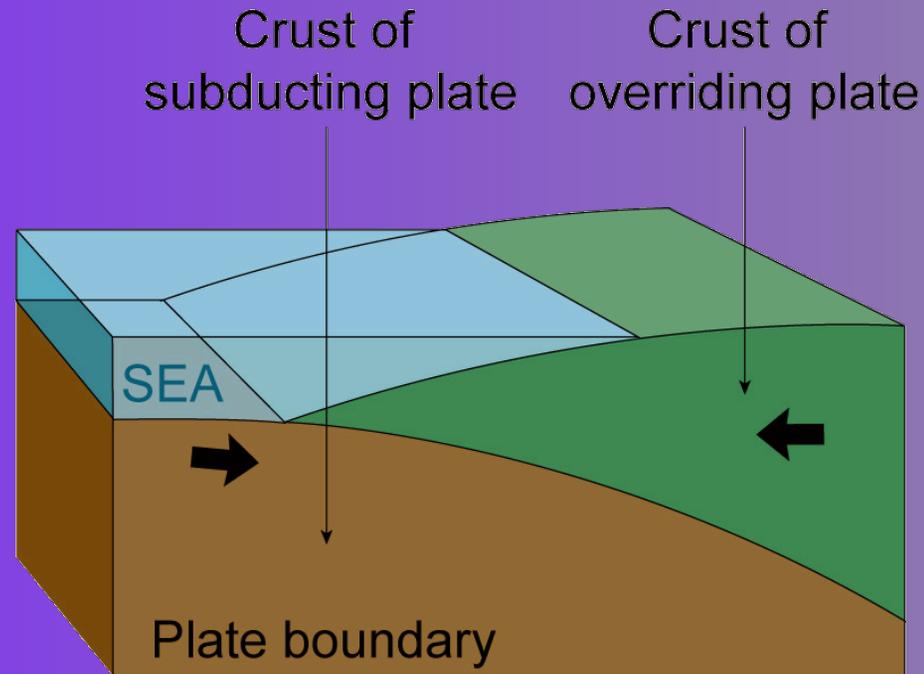
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OVERALL, a tectonic plate descends, or “subducts,” beneath an adjoining plate. But it does so in a stick-slip fashion.

After Atwater et al. (2005)

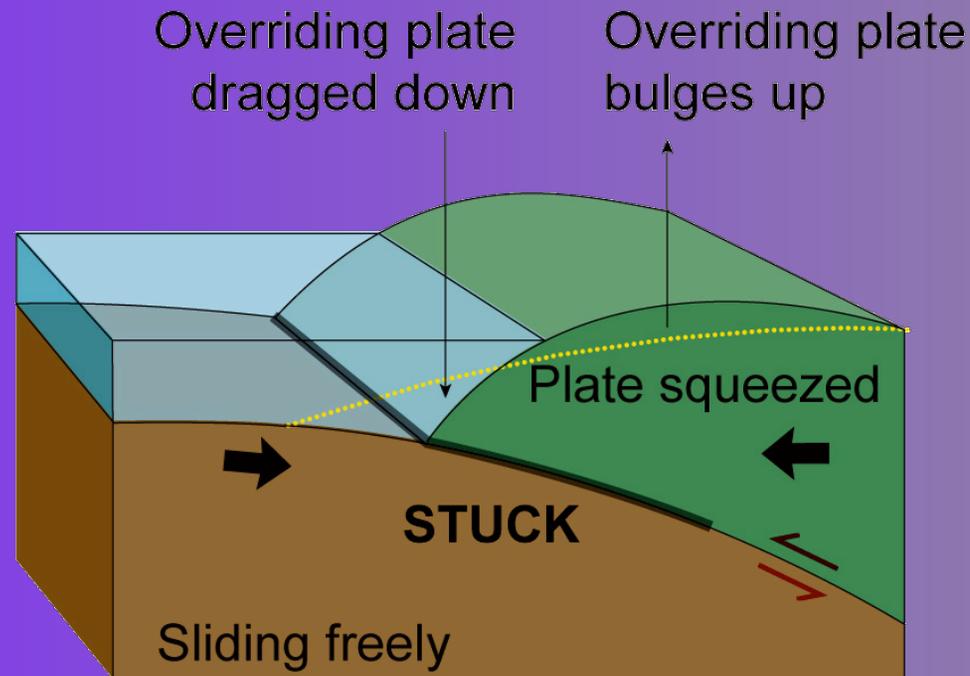
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BETWEEN EARTHQUAKES the plates slide freely at great depth, where hot and ductile. But at shallow depth, where cool and brittle, they stick together. Slowly squeezed, the overriding plate thickens.

After Atwater et al. (2005)

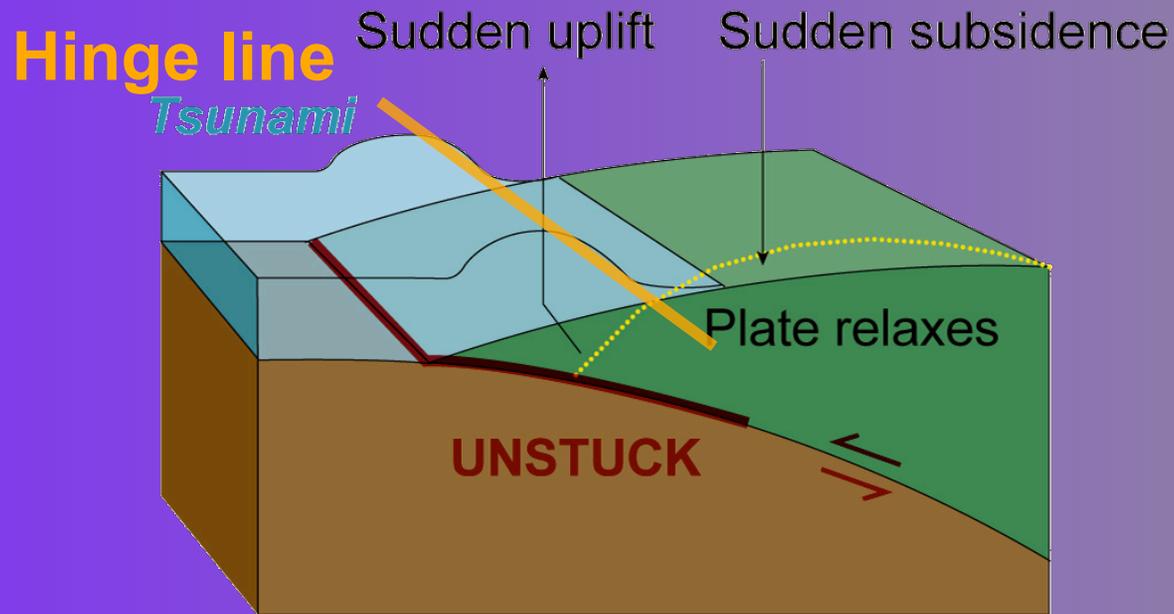
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DURING AN EARTHQUAKE the leading edge of the overriding plate breaks free, springing seaward and upward. Behind, the plate stretches; its surface fails. The vertical displacements set off a tsunami.

After Atwater et al. (2005)

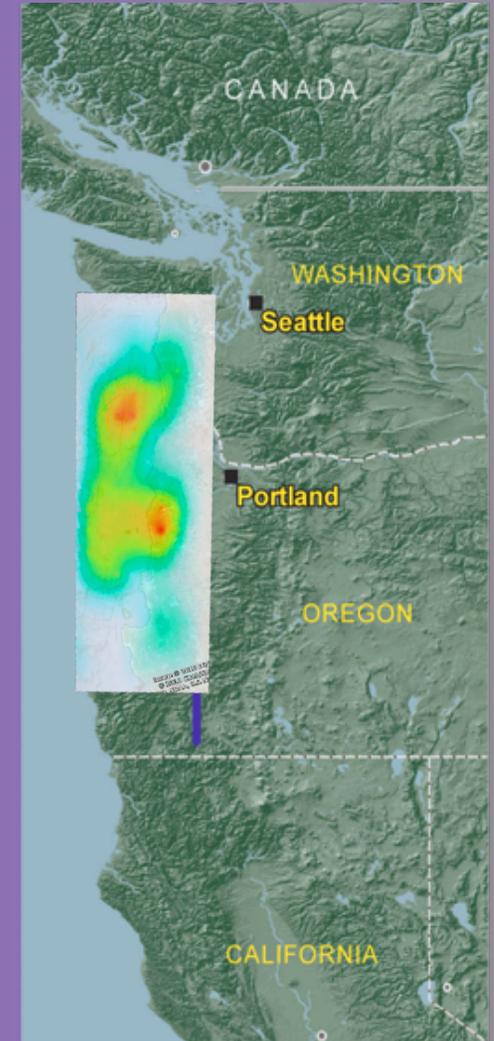
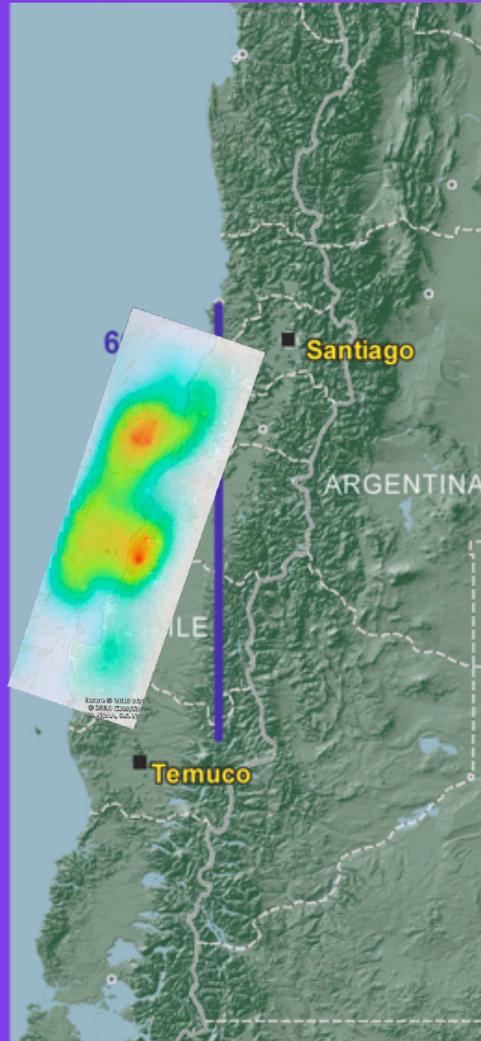
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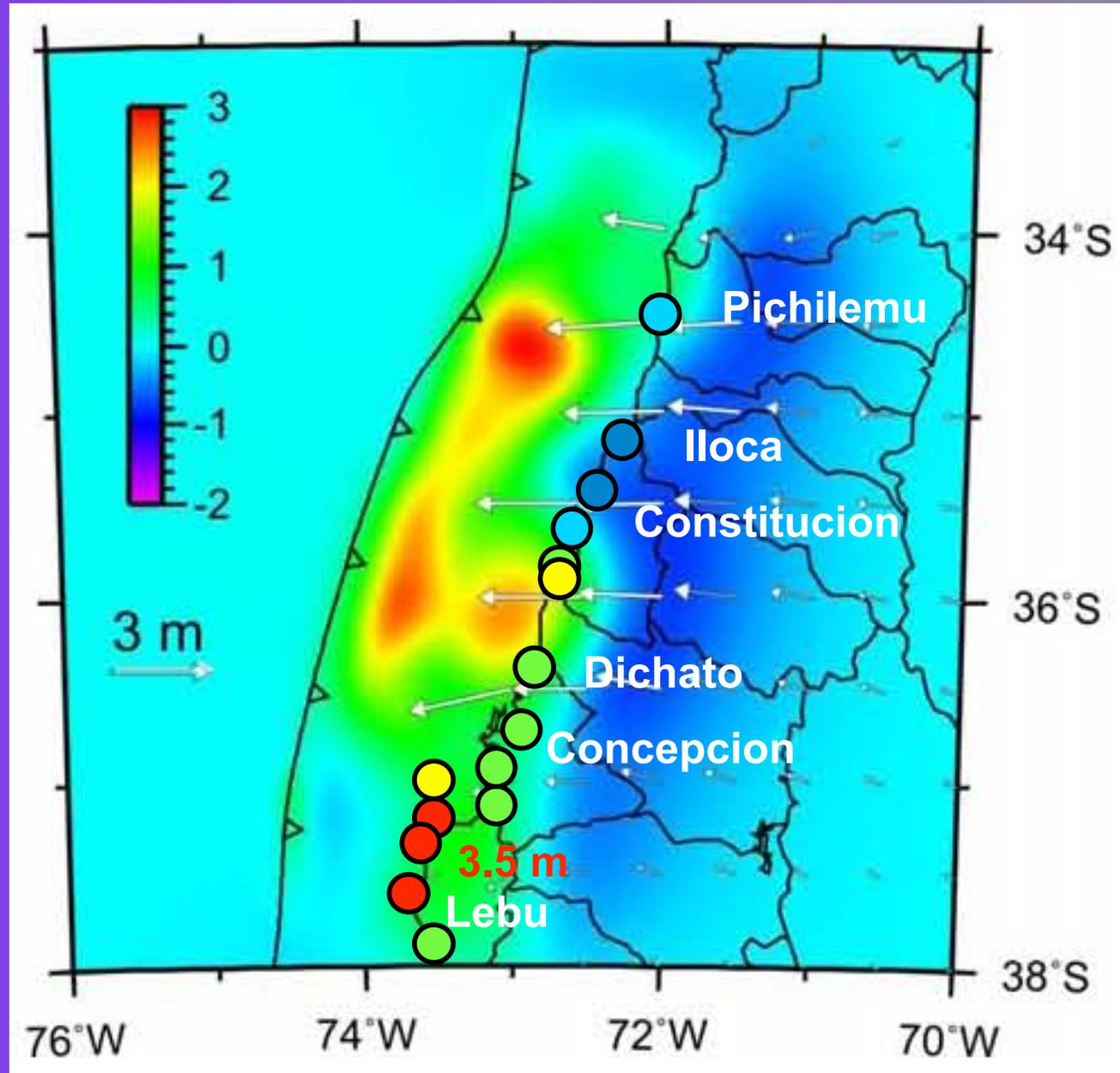
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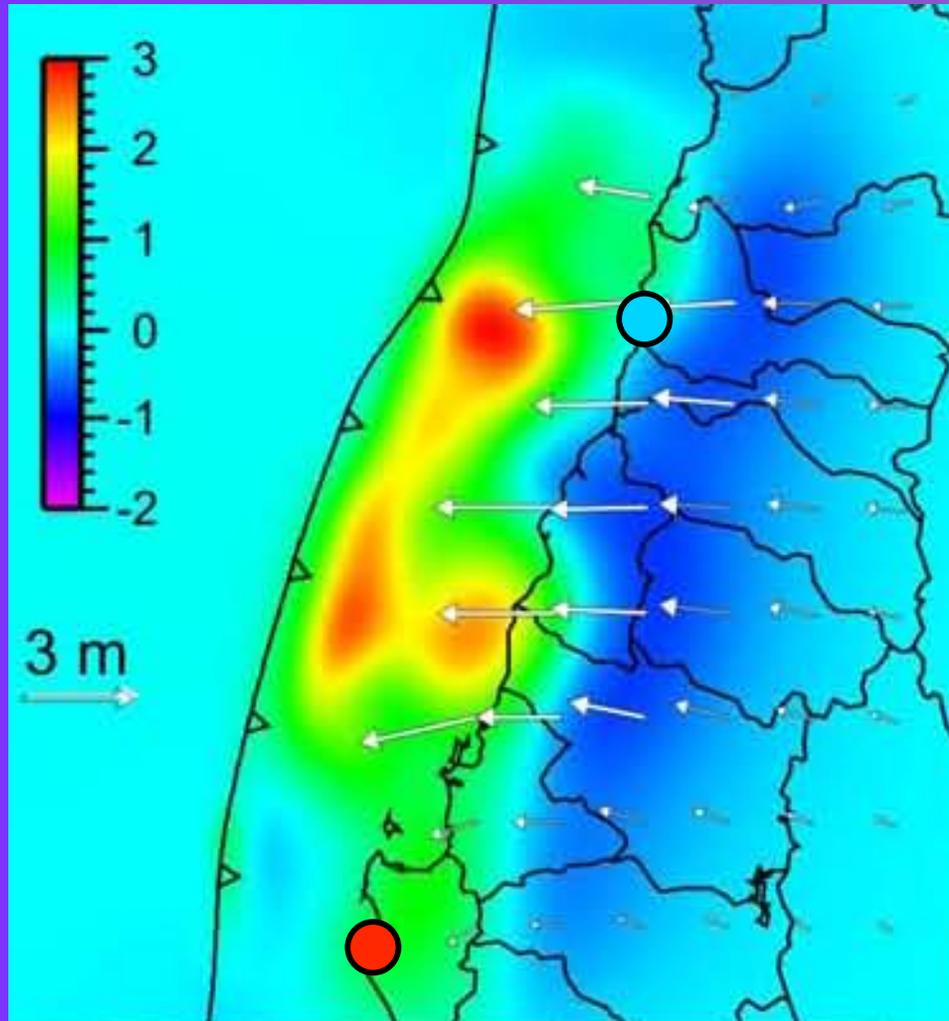
Tsunami

Estimated Coseismic Vertical Displacements



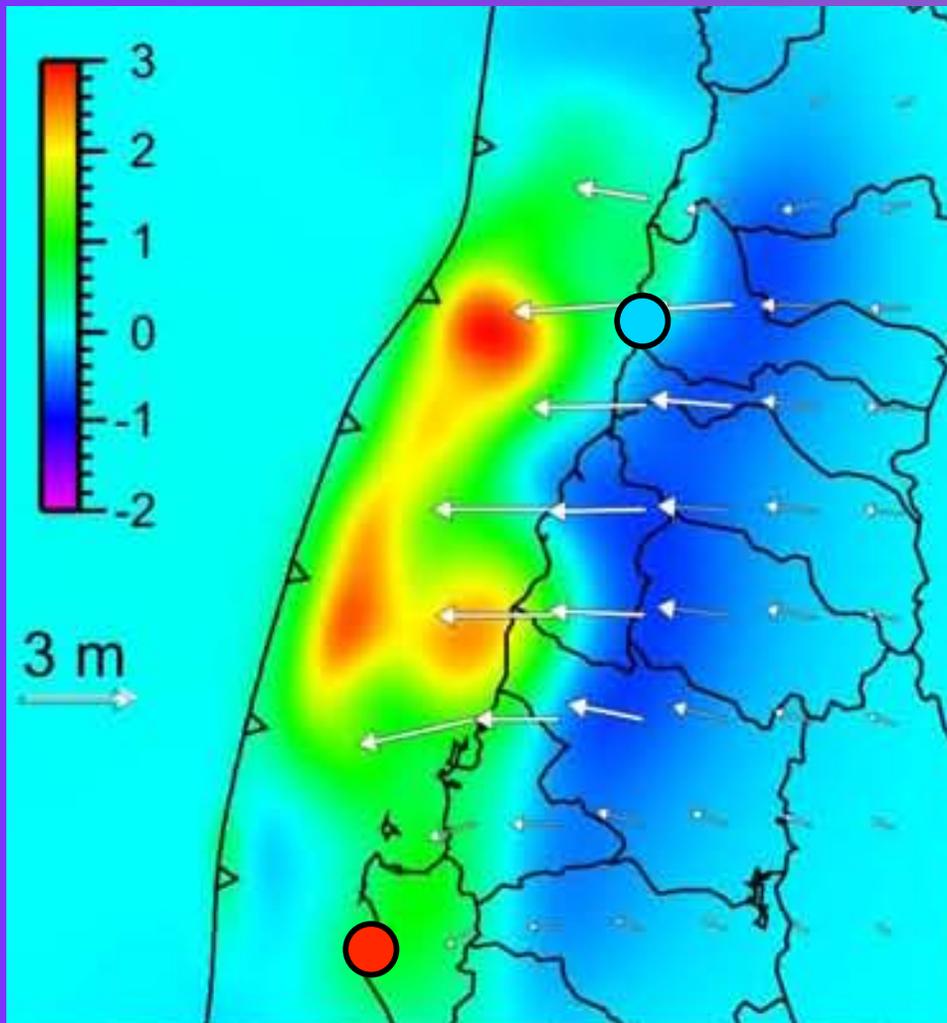
Tectonic Uplift and Subsidence

Pichilemu



Arauco Peninsula

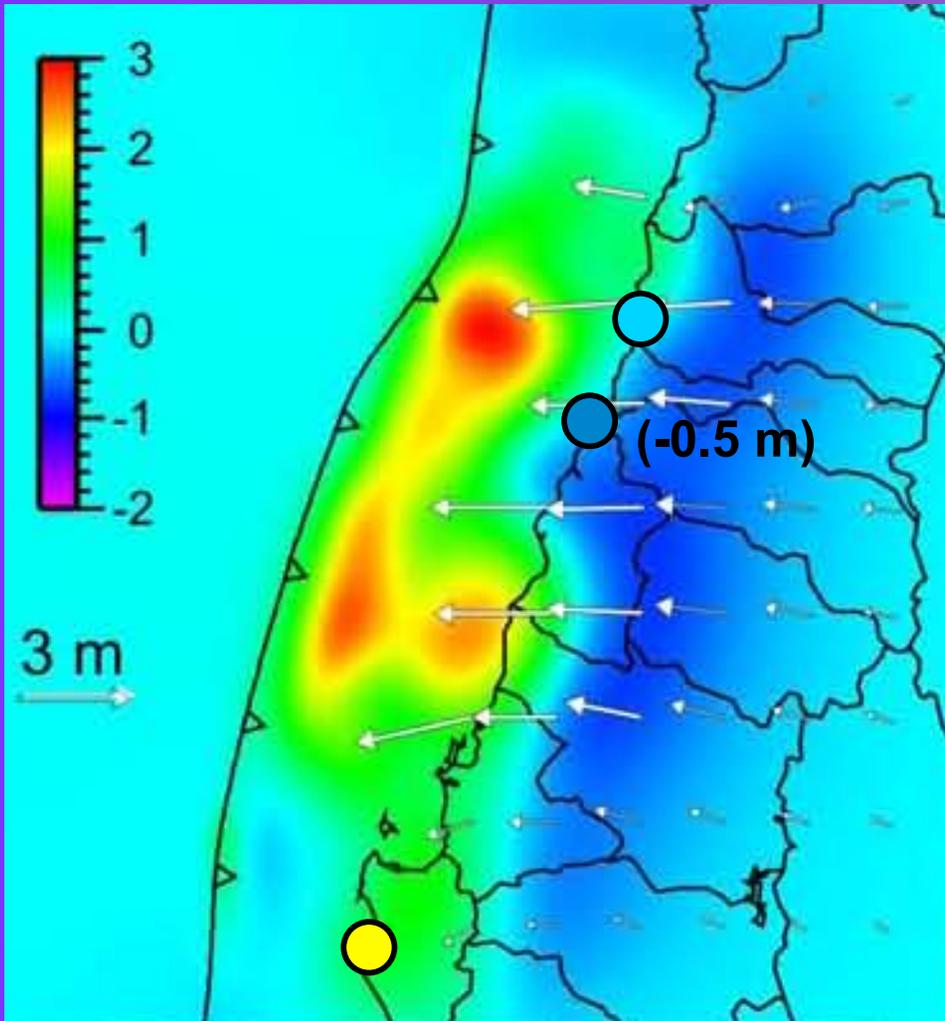
Tectonic Uplift



Lebu



Tectonic Subsidence



Iloca

Earthquake

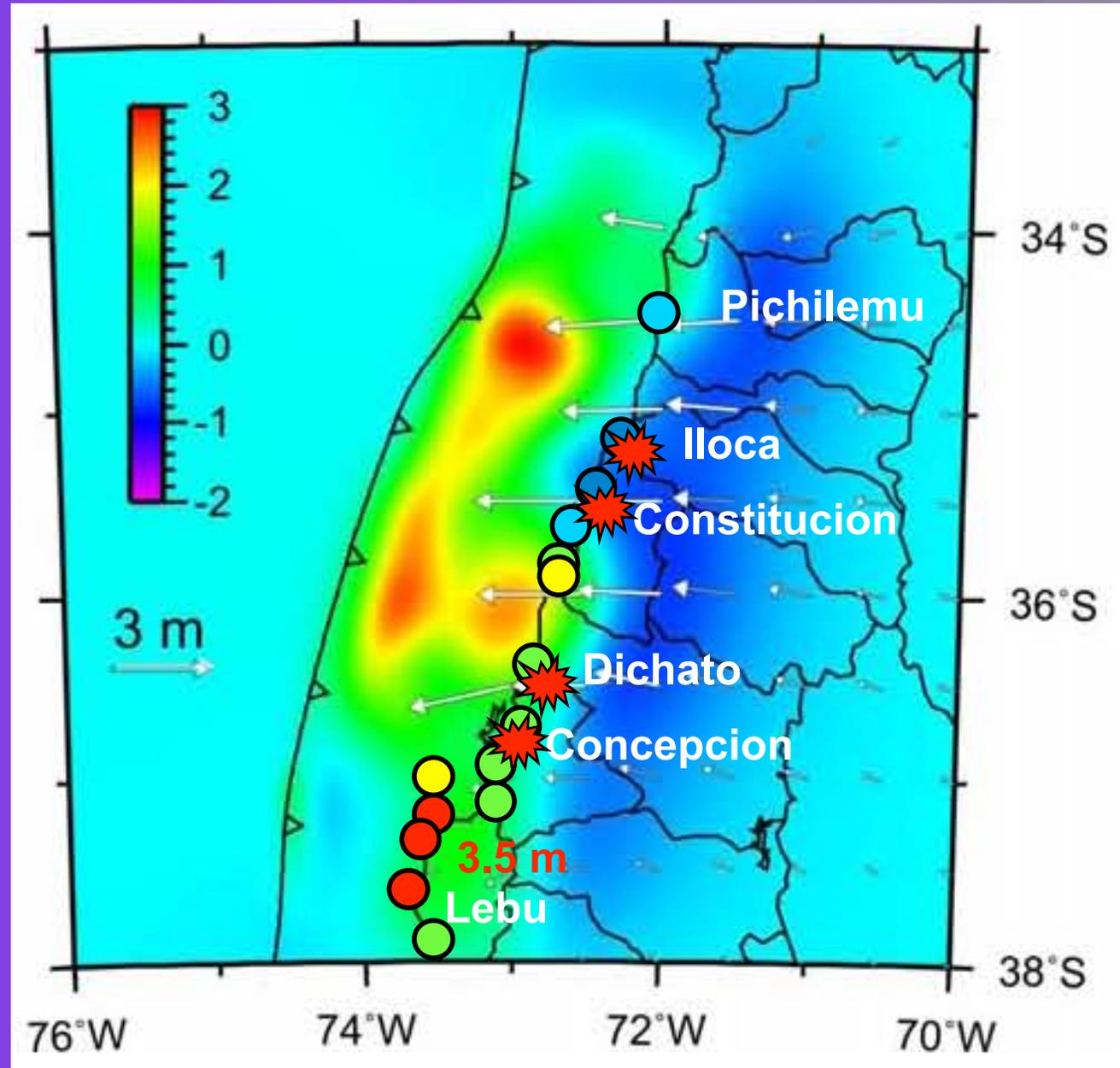
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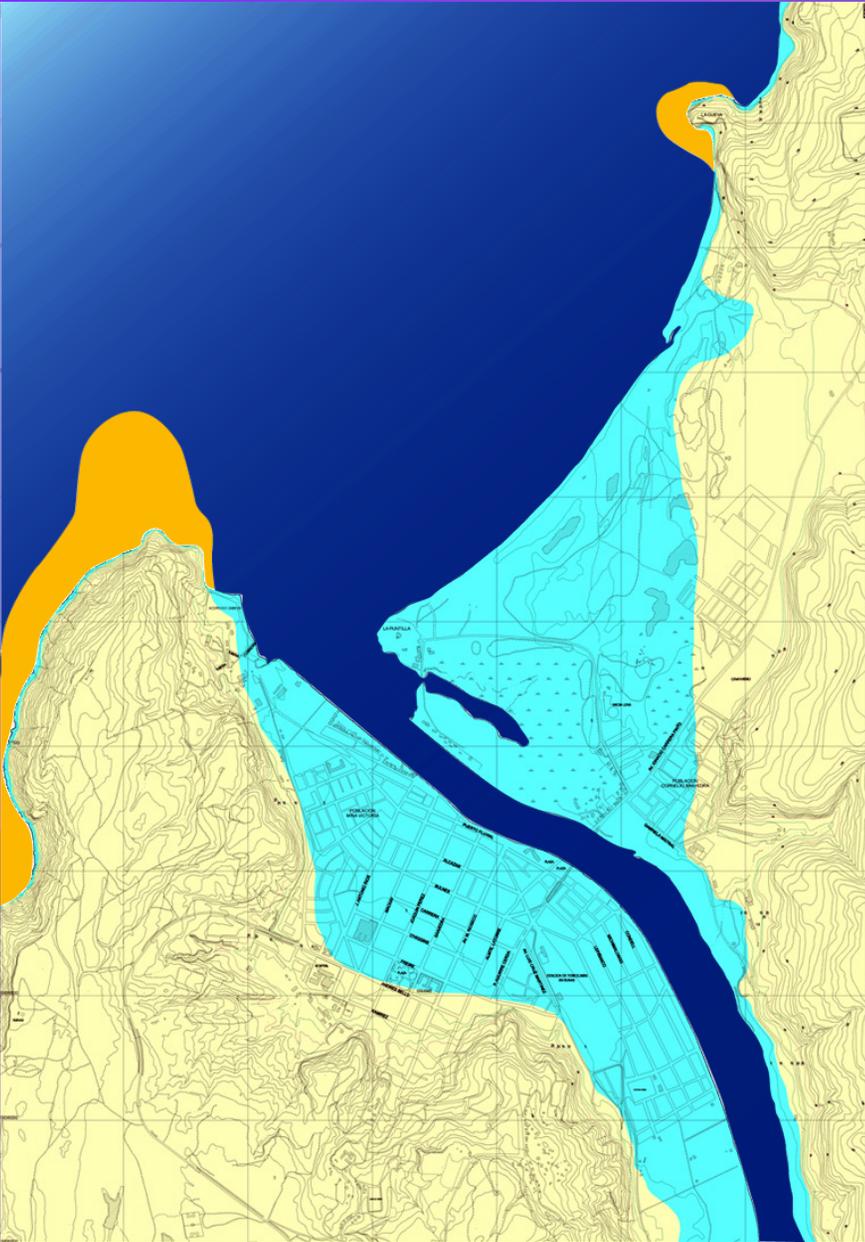
Uplift / Subsidence

Tsunami

Estimated Coseismic Vertical Displacements



Uplift Influenced Areas of Inundation



Earthquake

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Landslides

Landsliding: Highest concentrations--
Coastal bluffs on Arauco Peninsula
Logging roads in coastal mountains



Dry late summer =
Low soil moistures