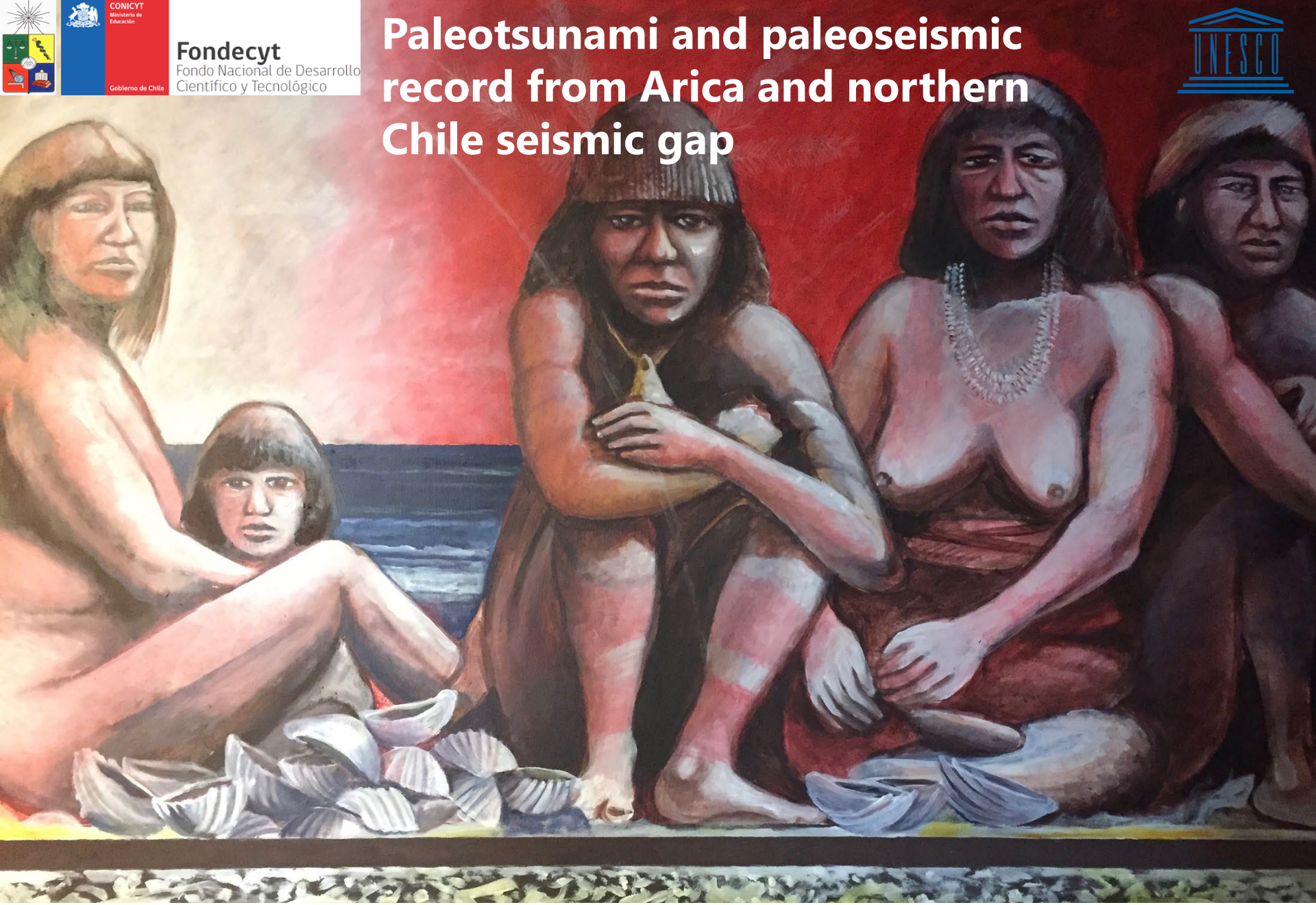
Paleotsunami and paleoseismic record from Arica and northern Chile seismic gap

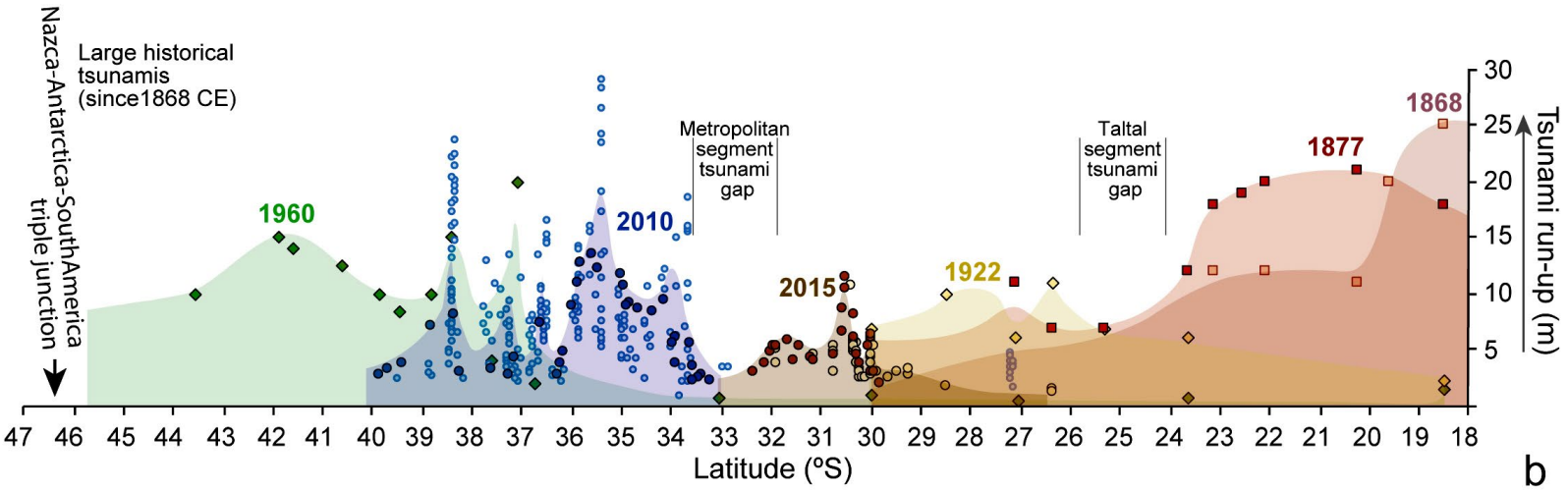


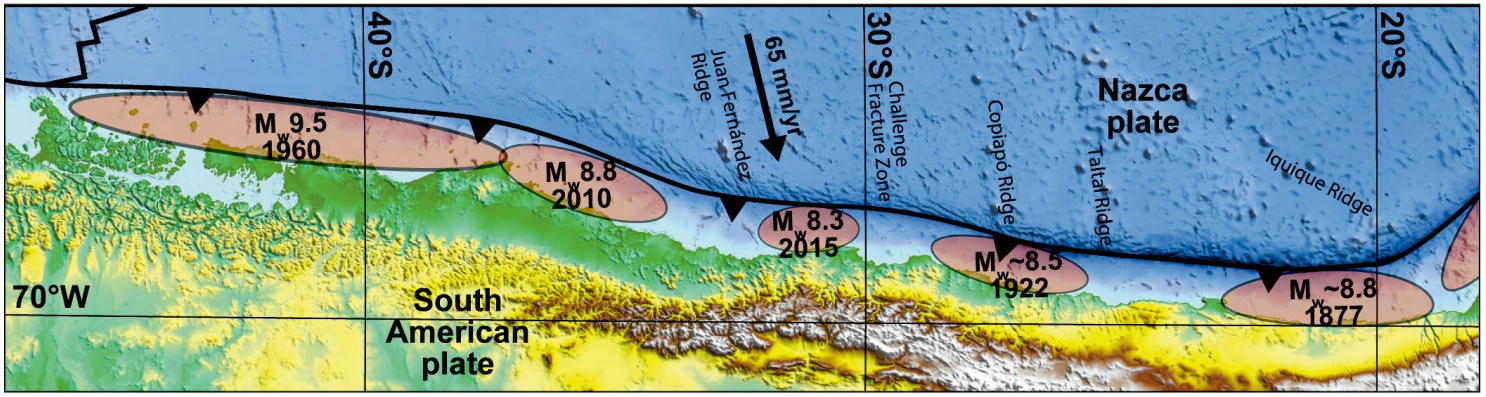
Gabriel Easton, Diego Salazar, James Goff *et al.* (geaston@uchile.cl)

Fondecyt 1201387

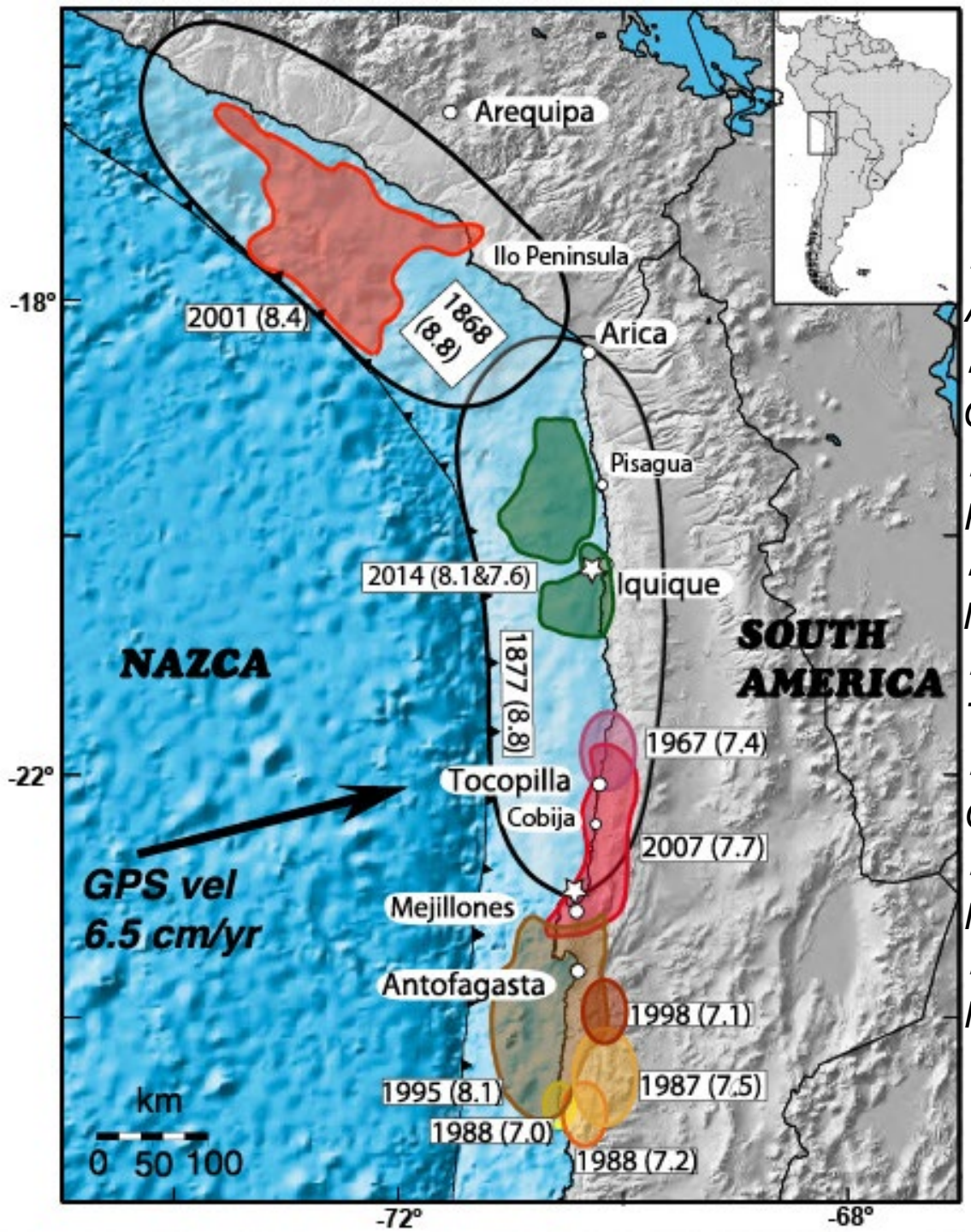
Arica, August 22-

Historical run-ups from recent large tsunamis





Tsunami gap: *"A coastal región that has not been recently impacted by a large tsunami originating in the subduction margin in front of it, that is, near the field"* (Easton et al., 2022)



Fondecyt 1201387: sites

➔ *Paleotsunami record from Arica (ca. 18ºS)*

➔ *Paleotsunami record from Camarones (ca. 18ºS)*

➔ *Offshore sediment core from Pisagua (ca. 19ºS)*

➔ *Offshore sediment core from Iquique (ca. 20ºS)*

➔ *Archaeological record from Tocopilla area (ca. 21ºS)*

➔ *Archaeological record from Cobija (ca. 22ºS)*

➔ *Offshore sediment cores from Mejillones (ca. 23ºS)*

➔ *Paleotsunami record from Mejillones peninsula (ca. 23ºS)*

Historical earthquakes rupture areas *(modified from Béjar-Pizarro et al., 2013; Métois et al., 2013; Ruiz et al., 2014)*

➔ We try to get paleoearthquakes and tsunamis from combining coastal offshore and onshore geological and archaeological records…

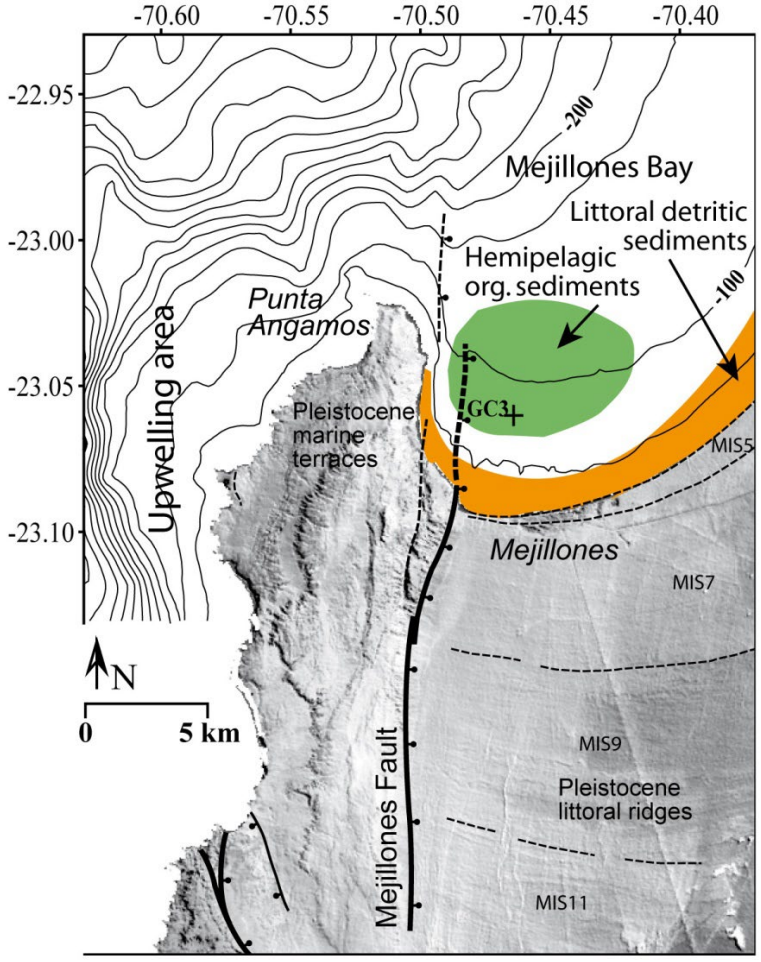
Mejillones Bay: Laminated sediments offshore

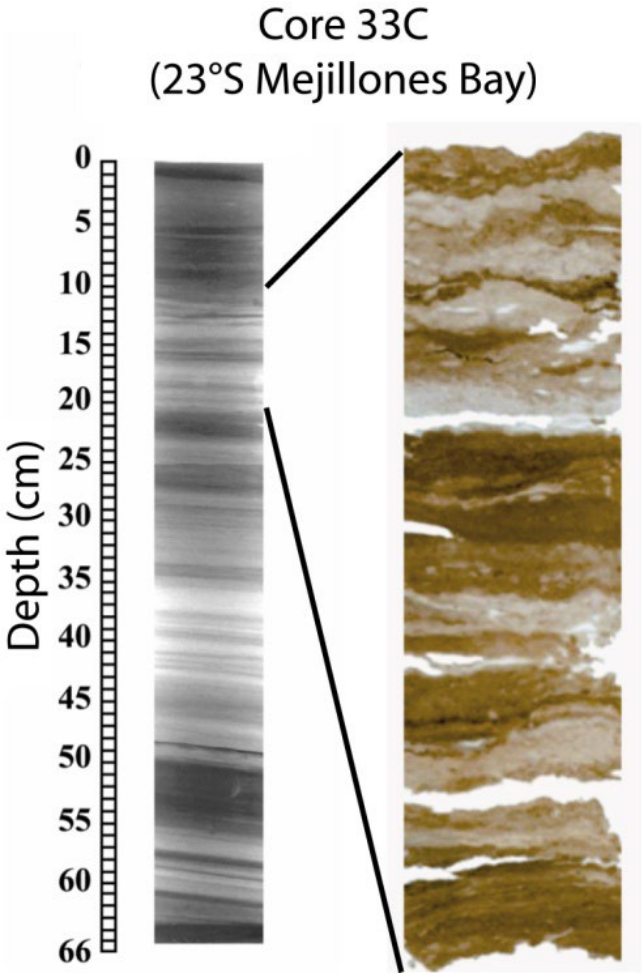
Hyperarid environment (<4 mm/year)

High ocean productivity, variable climatic conditions, minimum oxigen zone in the water column

➔Accumulation and preservation of laminated sediments on the shelf

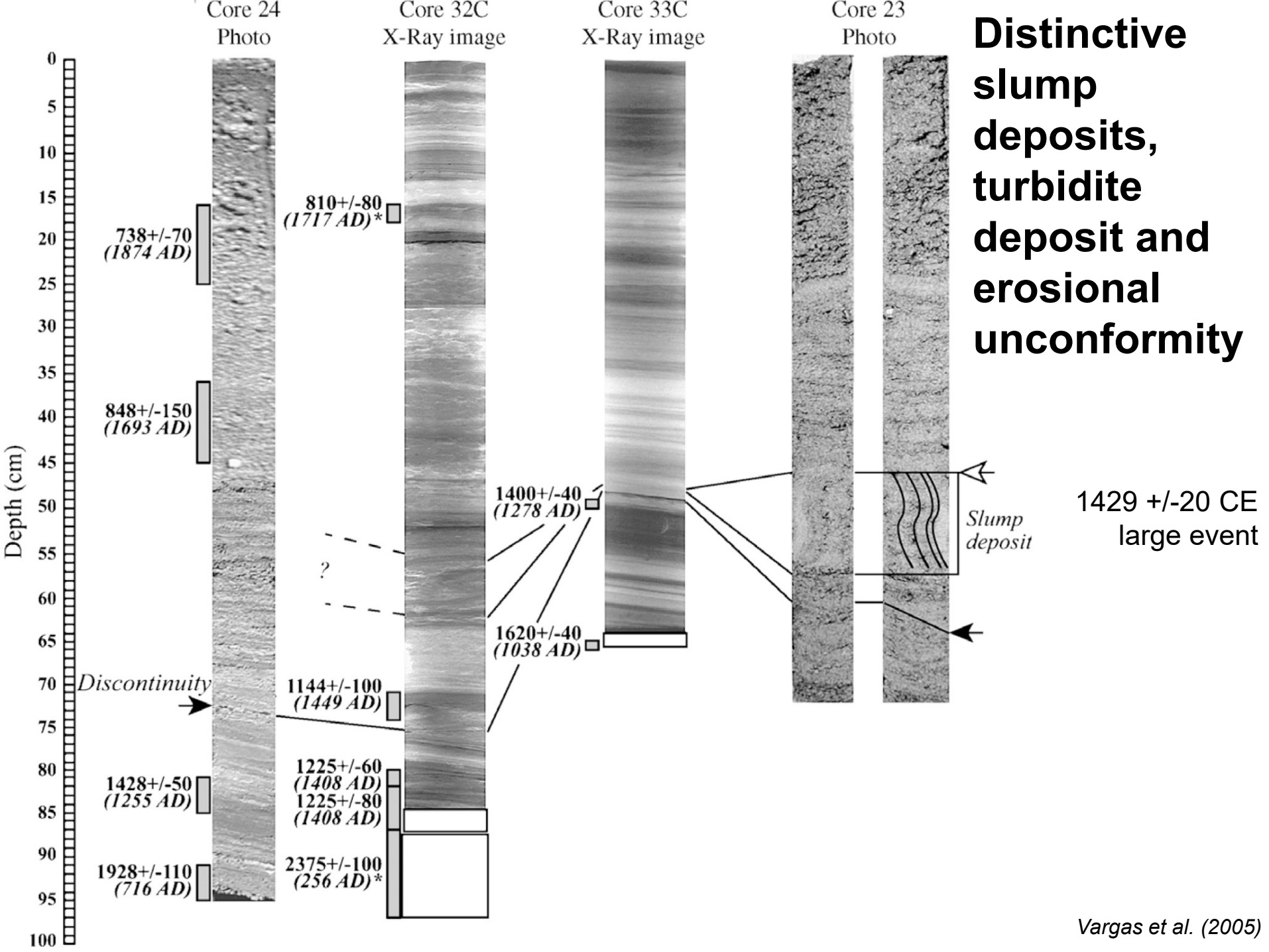
Local oceanographic condicitons





Marine laminated sediments: hemipelagic sedimentation of organic matter and biogenic rests (1.7+/- 0.2 mm/year)

Vargas et al. (2004)



Distinctive slump deposits, turbidite deposit and erosional unconformity

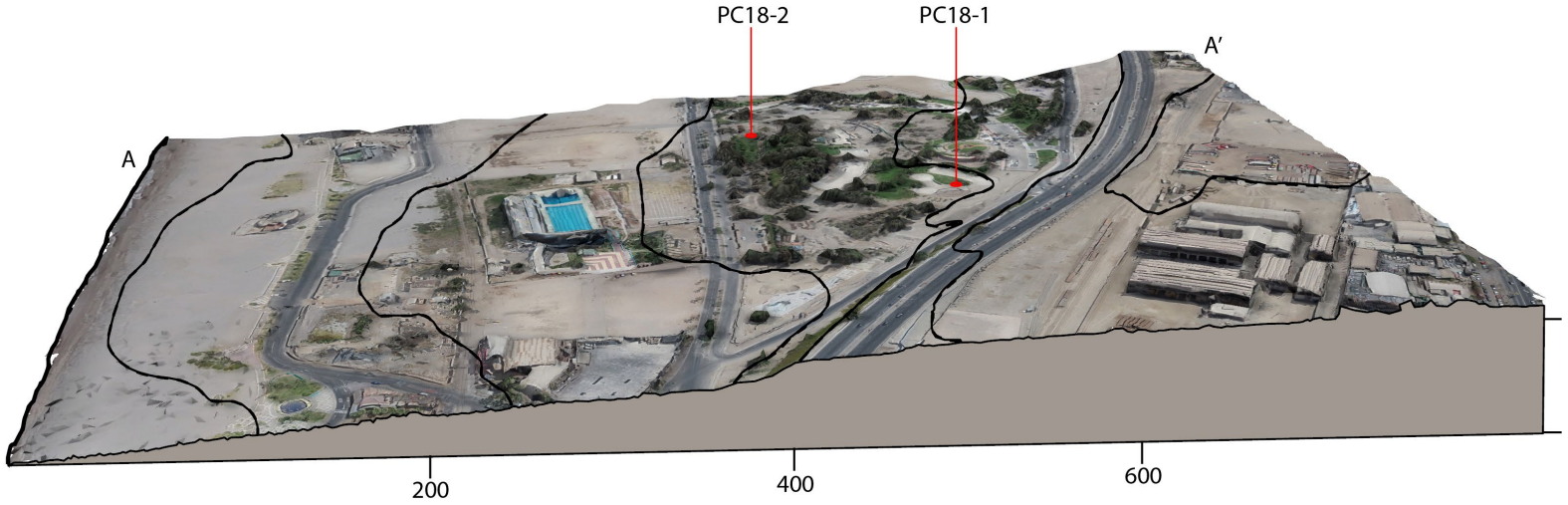
1429 +/-20 CE
large event

Vargas et al. (2005)

Geo-archaeological profiles for tsunami research at Cobija

(Fondecyt 1201387; work in progress)

Tsunami record from Arica
Parque Centenario



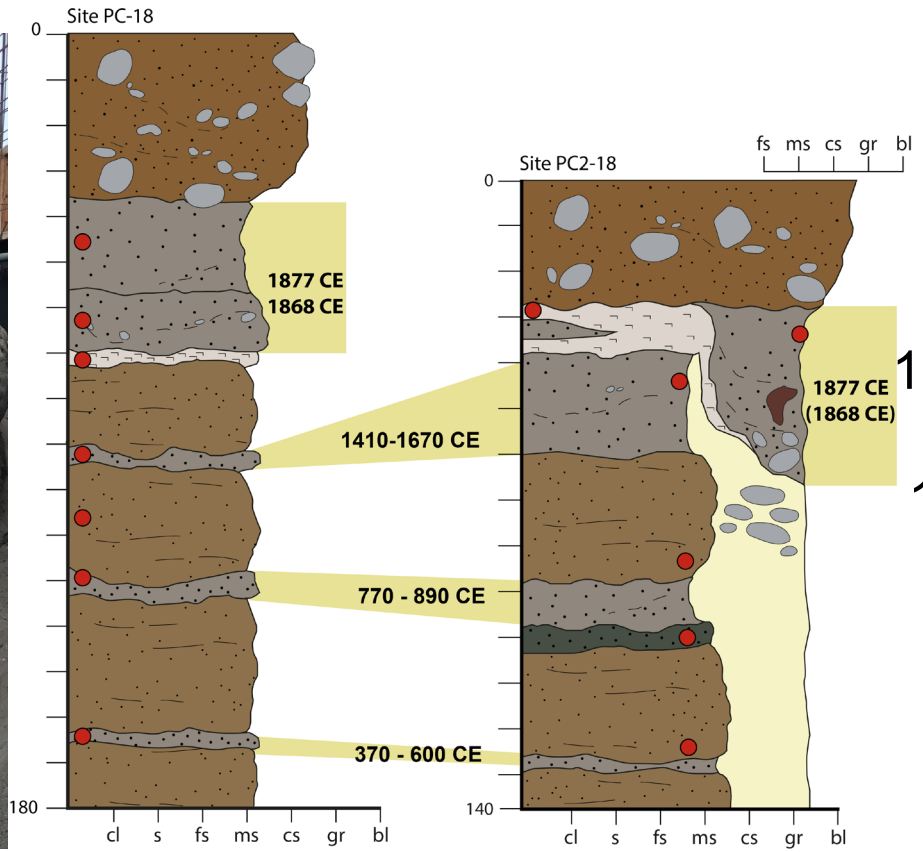
(Fondecyt 1201387; Easton et al., work in progress)

Wateree!

(Fondecyt 1201387; Easton et al., work in progress)

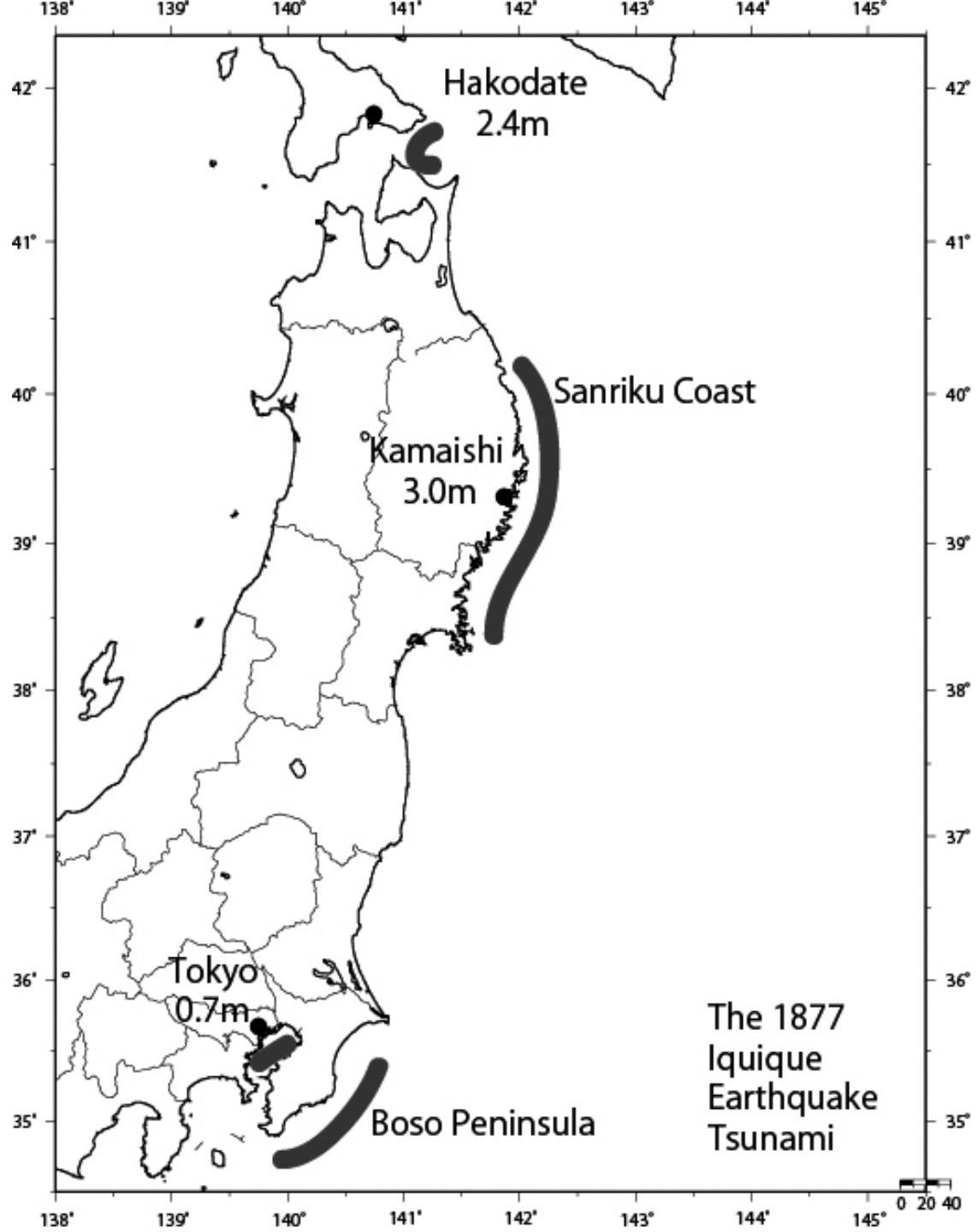
(Fondecyt 1201387; Easton et al., work in progress)

Arica paleotsunami record: chronostratigraphy and correlation

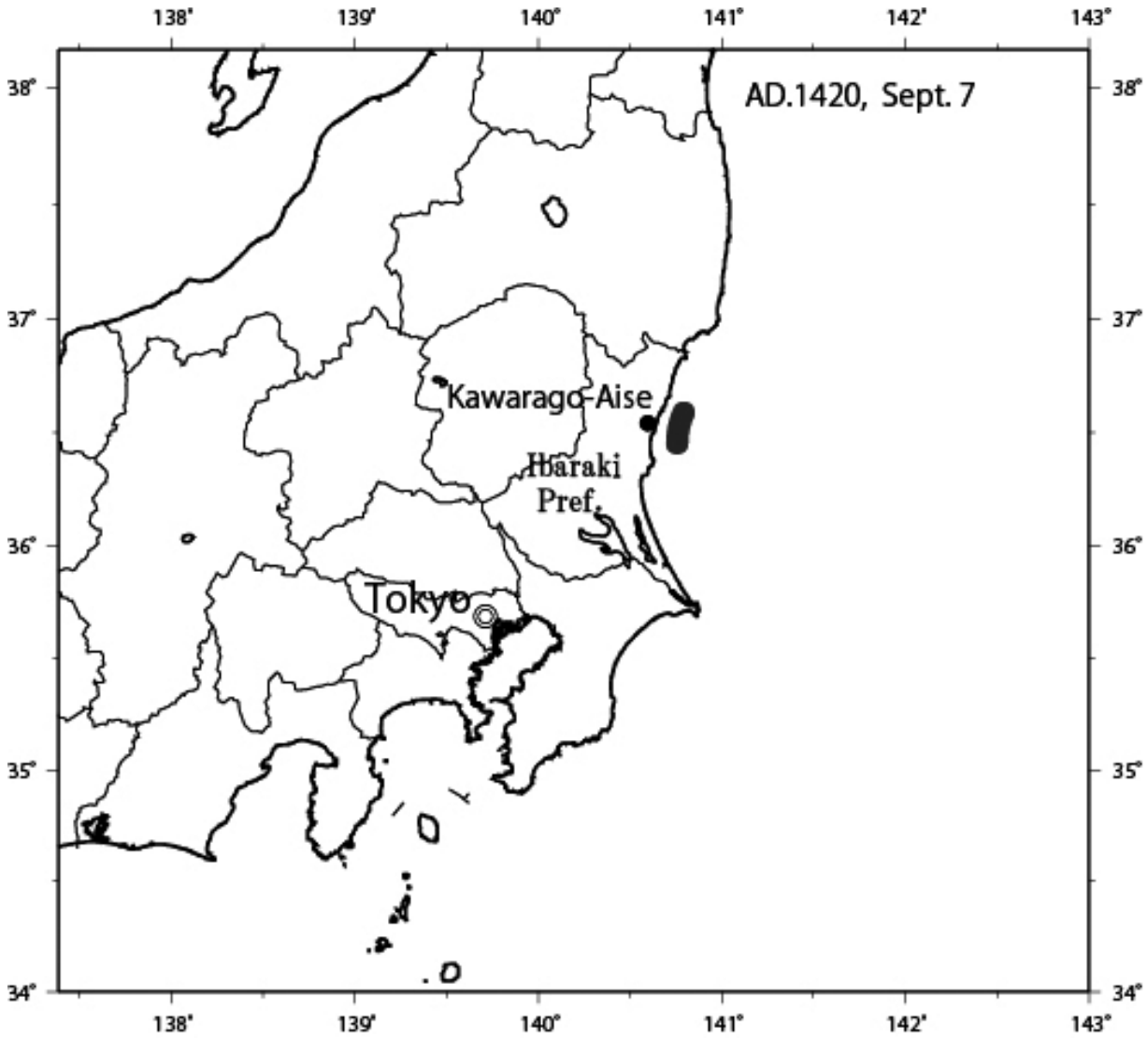


Arica (this work)	**Japón** (Tsuji, 2013)
1877 (1868) CE	1877 CE
1410-1670 CE	1420 CE
770-890 CE	799 CE
370-600 CE	Previous

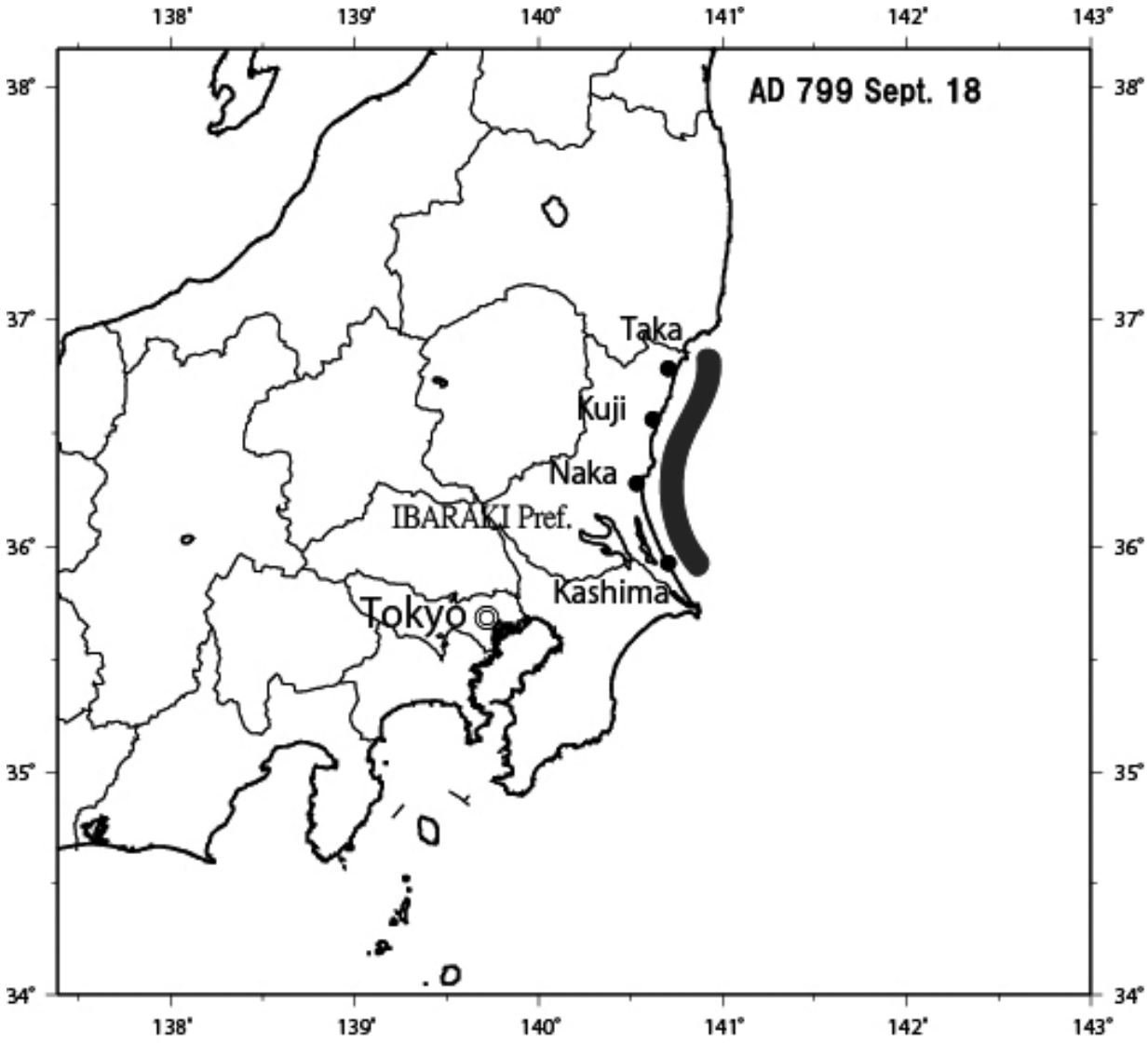
(Fondecyt 1201387; Easton et al., work in progress)



The May 10 1877 CE episode from Northen Chile *impacted the coast of Japan, causing strong damages, with tsunami heights between 0.7-3 m (Tsuji, 2013)*



***The September 7 1420 CE episode in Japan**:*
"On the 20th of the month, from 6 to 10 AM, the sea withdrew nine times at Kawarago Aise (Aise fishery port, Hitachi city, Ibaraki Prefecture), and many fishes were washed up on land. No earthquake was felt, and this tsunami is also considered to be a distant tsunami. ***It is possible the source was the Chilean coast.****" (Tsuji, 2013)*



***The September 18 799 CE episode in Japan**:*

*"…from the morning to the evening, the sea tide flooded and withdrew 15 times along the coasts of Kashima, Naka, Kuji and Taka counties. Sea water came inland by about 100 m from the shoreline during the floods, and the sea floor was exposed up to 2 km from the shore line. Even elderly people living on the coasts had neither seen and nor heard of anything like this during their lives. The source is unknown, but **it is possible this tsunami came from the Chilean Coast**." (Tsuji, 2013)*


(Fondecyt 1201387; work in progress)