Tsunami Effects
of the February 27, 2010 Chile Earthquake

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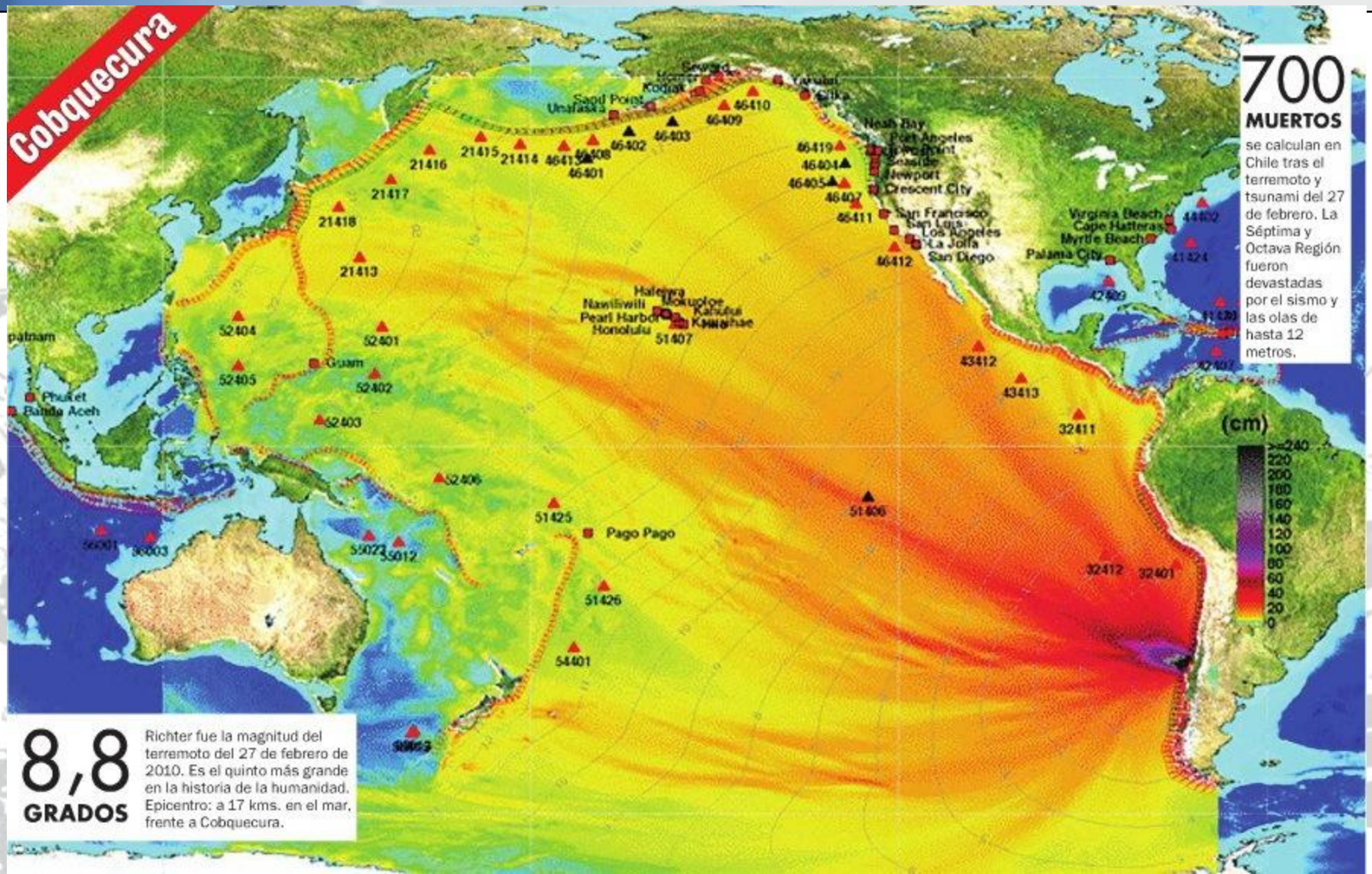
Tsunami Focus

- Team Members:
  - Ian Robertson, Ph.D., P.E., Professor, University of Hawaii
  - Gary Chock, P.E., Principal, Martin & Chock Inc.
  - Juan Morla, P.E., Structural Engineer, Martin & Chock Inc.
- Objectives:
  - Survey coastal region around Concepcion/Talcahuano for tsunami damage
  - Attempt to distinguish between damage induced by earthquake ground-shaking and tsunami inundation
  - Determine whether earthquake damage lead to reduction in tsunami resistance
  - Particular attention on debris impact and scour effects.

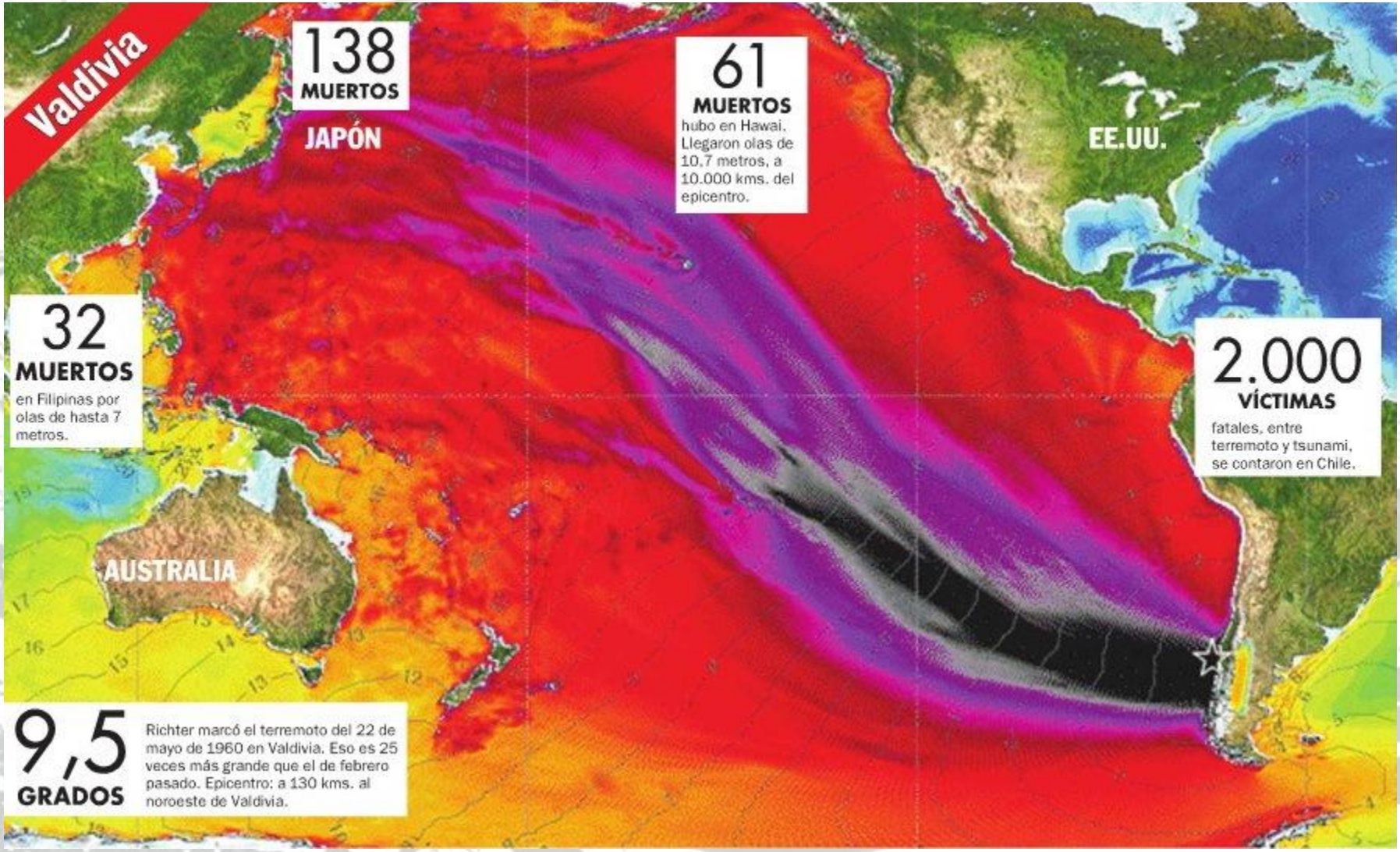
Tsunami Observations

- Tsunami damage was highly directional
- Timber framed residential structures were destroyed or severely damaged by the tsunami inundation
- Reinforced concrete and constrained masonry buildings generally performed well
- Significant scour around bridge and building foundations lead to a number of failures
- Tsunami-induced fluidization of loose fill material appears to have contributed to wharf and pier failures in Talcahuano bay
- Tsunami debris in the form of ships and shipping containers resulted in impact damage to port facilities

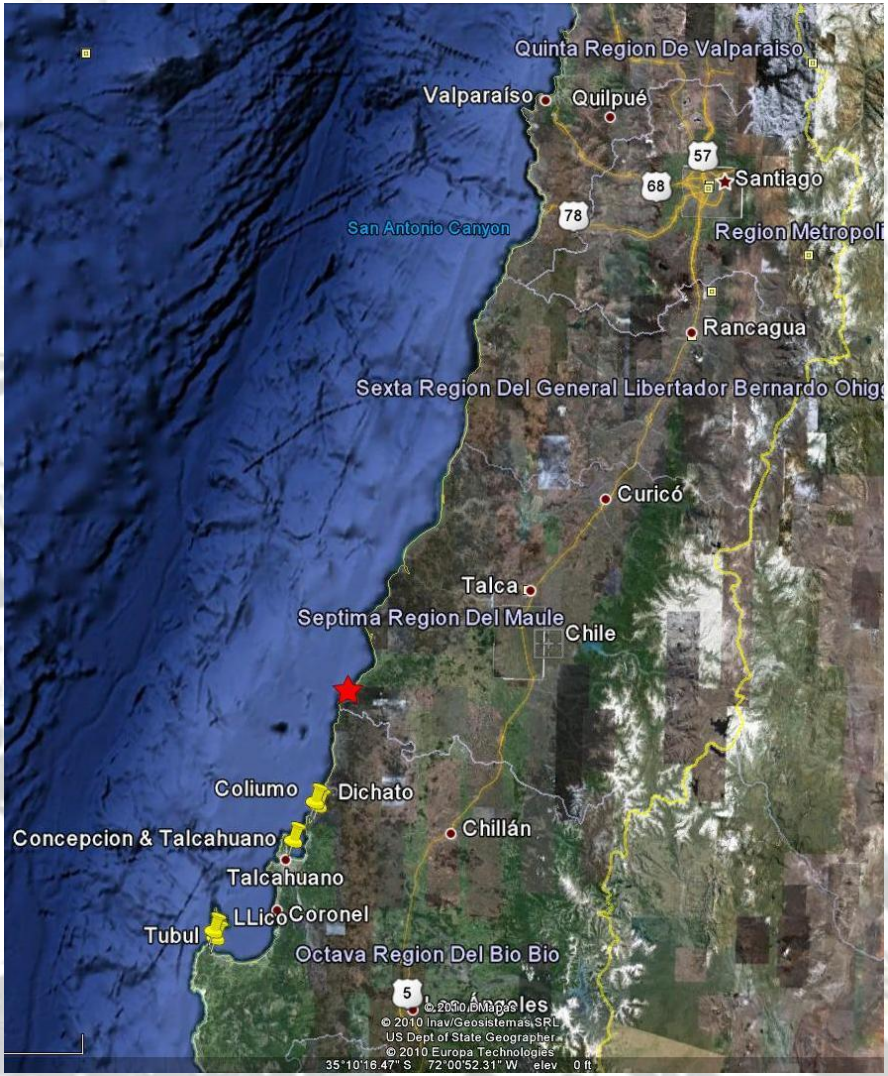
Tsunami wave heights (NOAA) Feb. 27 2010, 8.8 Eq

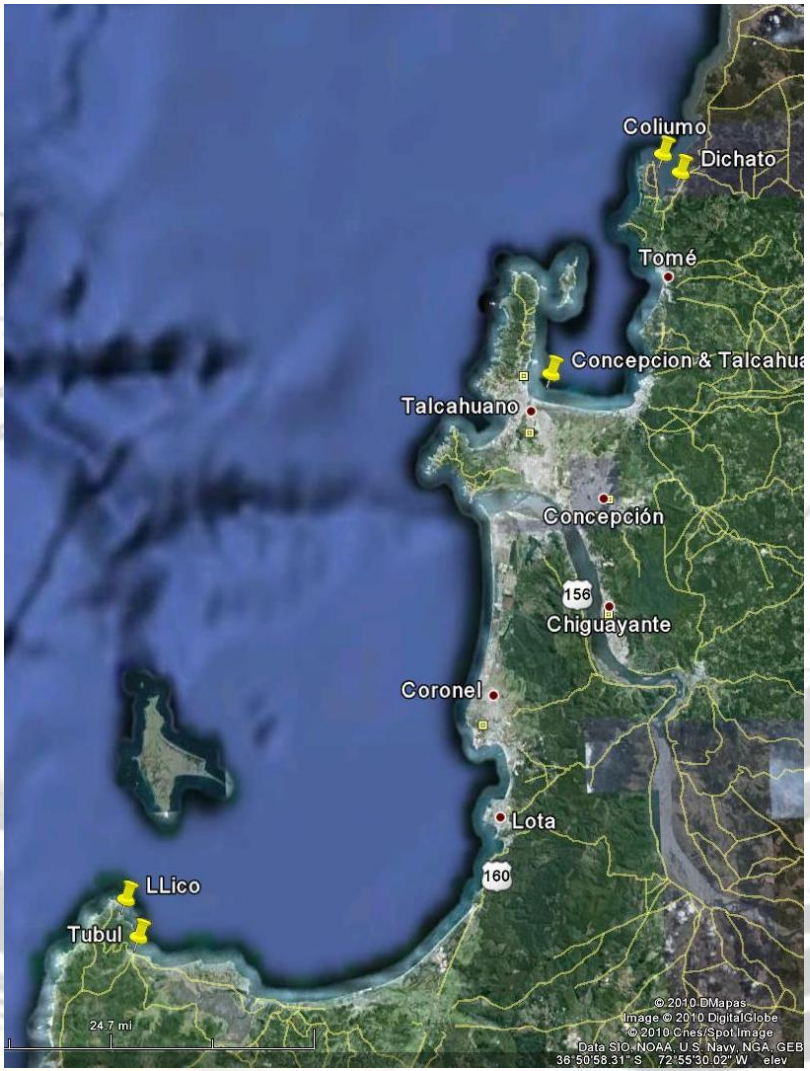


Tsunami wave heights (NOAA)
May 22 1960, 9.5 Eq



Map of Survey Area





Housing Devastation Dichato

Housing Devastation Dichato

Housing Devastation Dichato

Housing Devastation Coliumo

Housing Devastation
Clean up and Temporary Camps

Evacuation Signs

Building Success Story
Dichato

Scour and Fluidization
Fish pumping Station, Talcahuano

Scour and Fluidization
Warehouse and pier, Talcahuano

Scour and Fluidization
Warehouse and pier, Talcahuano

Scour and Fluidization
Warehouse and pier, Talcahuano

Scour Damage

Scour Damage

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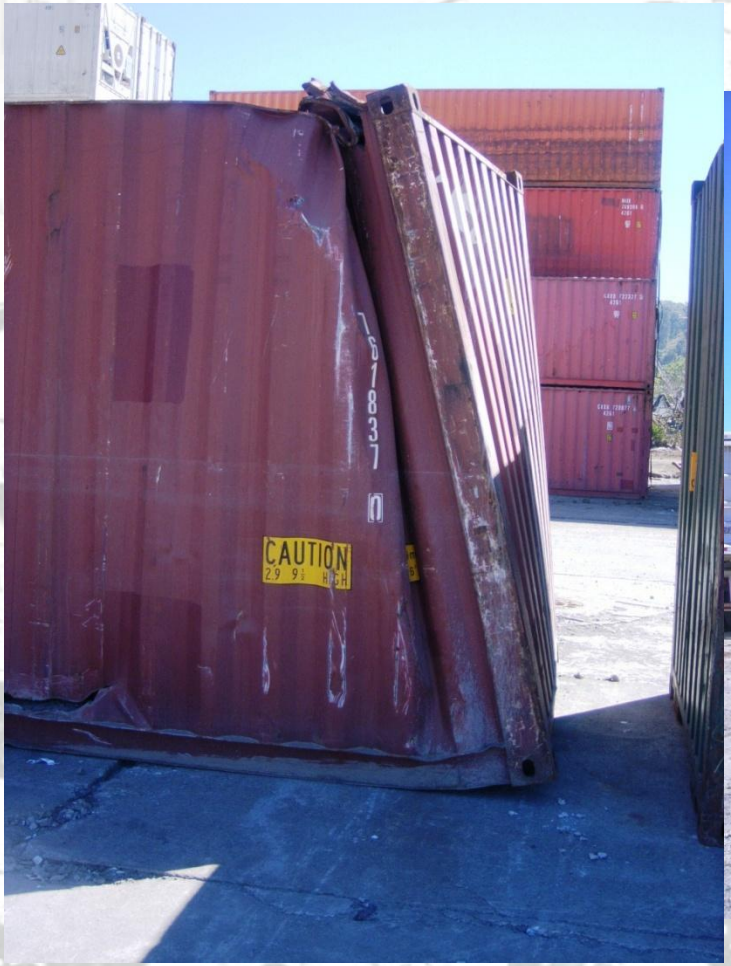
Debris Impact

Debris Impact



Debris

Debris Impact

Debris Impact