

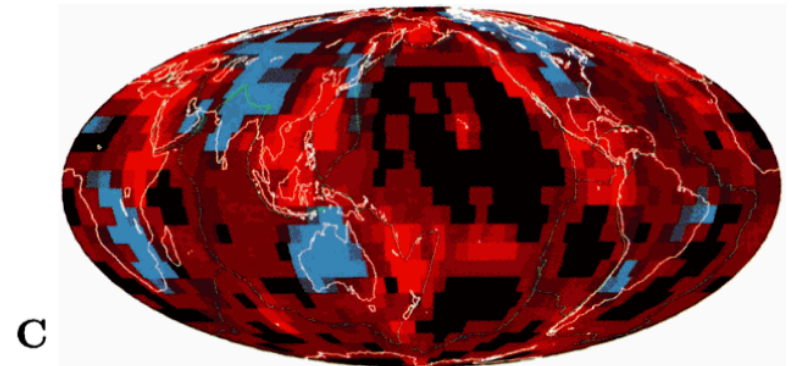
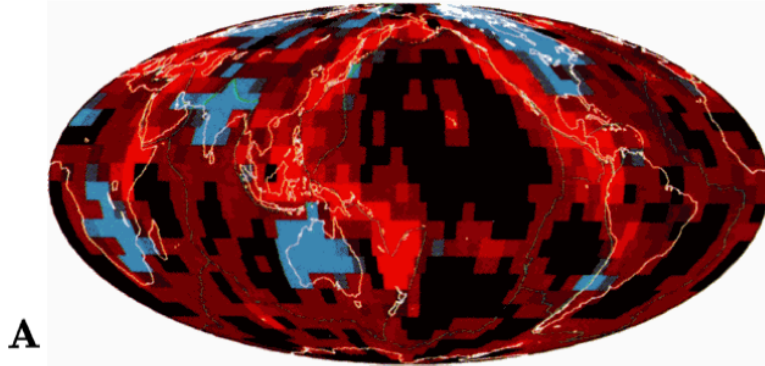
50 Years and Counting

Past and current collaborations
between the ISC and the NEIC

ISC and Me

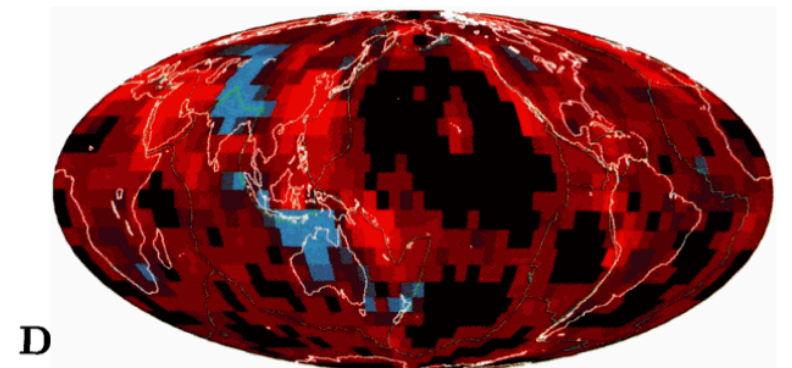
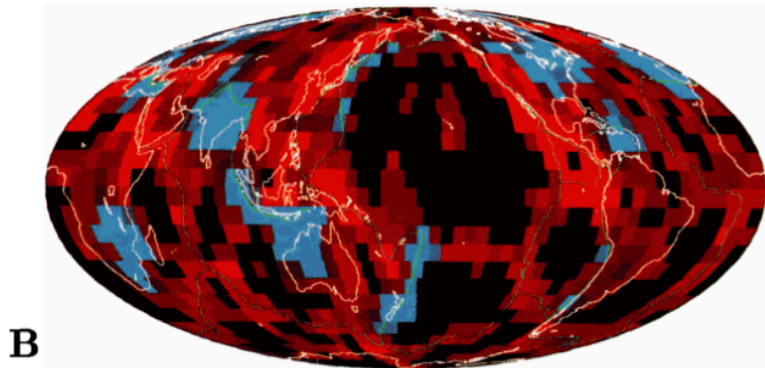
IASP3D P (35–200 KM)

IASP3D P (200–400 KM)



IASP3D S (35–200 KM)

IASP3D S (200–400 KM)



-1.00 VELOCITY DEVIATION (PERCENT) 1.00

-1.00 VELOCITY DEVIATION (PERCENT) 1.00

Vasco, Johnson, Pulliam, and Earle 1994

ISC data has provided many new and experience researchers with:

- A background in global seismicity
- Experience processing large geophysical datasets
- An understanding of the strengths and weaknesses of historic geophysical data
- A data set for experimenting with and understanding earthquake location and magnitude estimation techniques

ISC and NEIC



Some coordination highlights

- Edward Arnold was Director 1970 to 1977
 - ISC director while on leave from USGS / Coast and Geodetic Survey
 - Adapted ISC operations for digital computer processing
 - Oversaw the move of ISC from Edinburgh to Newbury
 - Left ISC with a British accent
- Bob Engdahl on the ISC executive committee while branch chief at NEIC
- NEIC shared event nucleation programs 1960s allowing ISC to independently find earthquakes in unassociated pick data
- NEIC offered to house ISC during relocation negotiations
- ISC-EMSC-NEIC coordination meetings (started ~2005)
 - Share and coordinate methodologies and operational procedures
 - Defined standards that have been accepted internationally
 - International Station Registry
 - ADSL station code standards
 - Event type nomenclature

Arrival time and amplitude readings (Jan to June 2011)

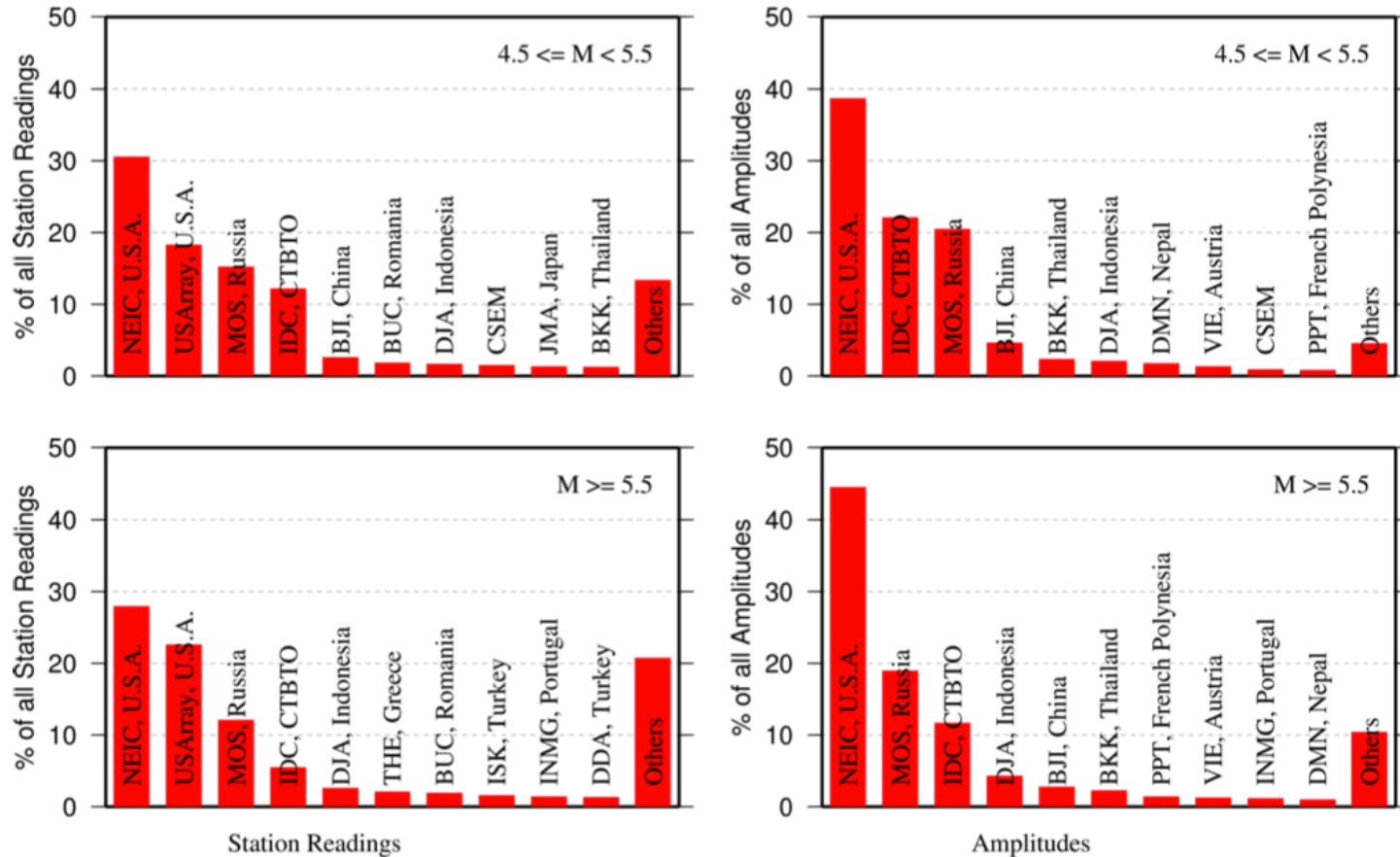
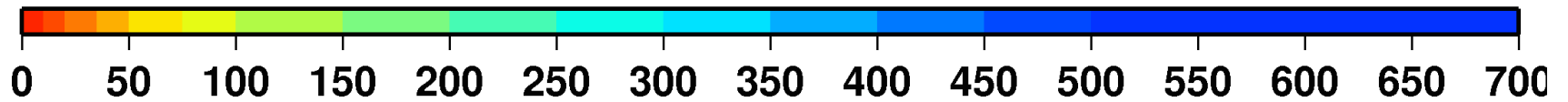
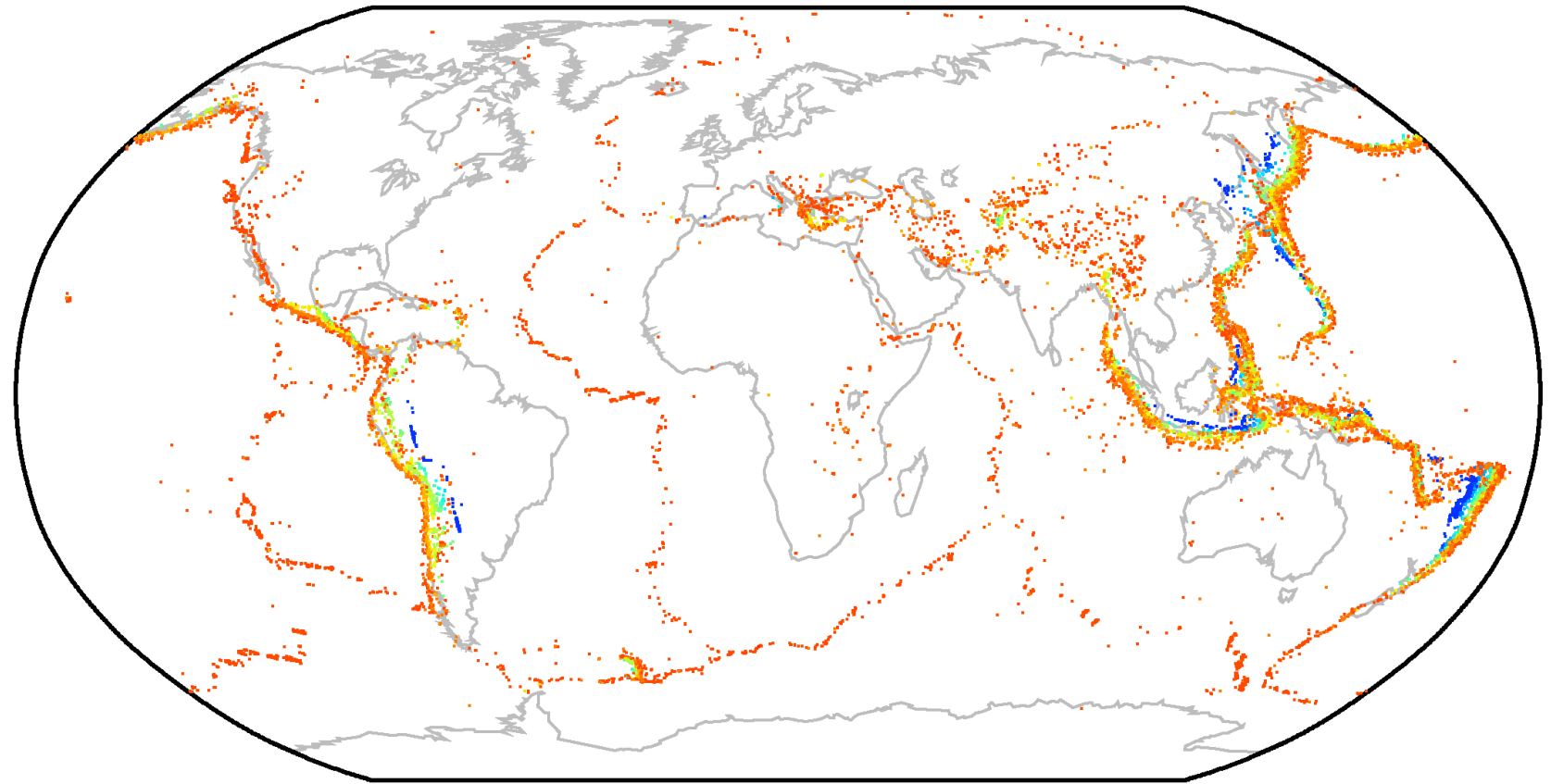


Figure 11.2: Contributions of station arrival time readings (left) and amplitudes (right) of agencies to the ISC Bulletin. Top ten agencies are shown for four magnitude intervals.

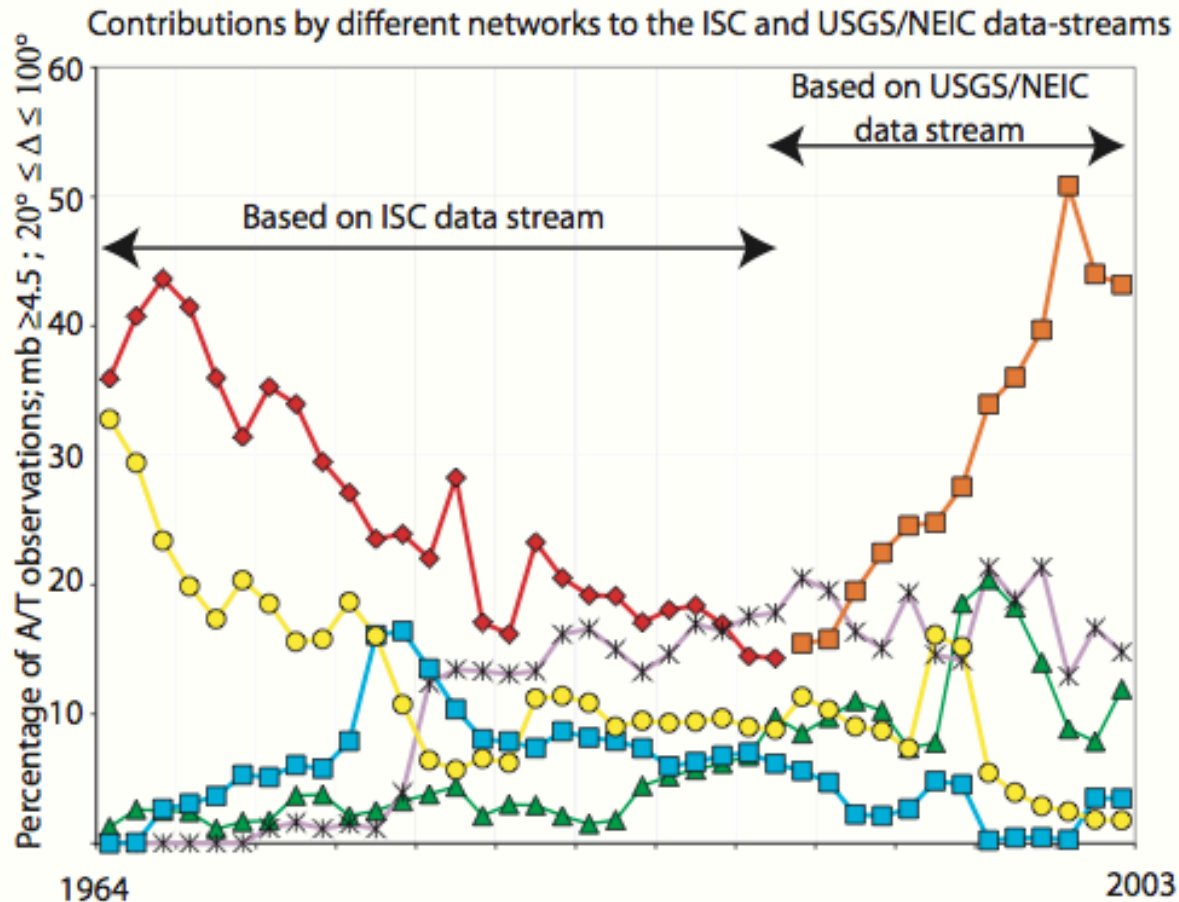
USGS is an ongoing financial supporter of the ISC-GEM catalog extension



Depth [km]

Image from: <http://www.isc.ac.uk/>

NEIC Reliance on ISC Data Stewardship



- ◆ Stations that were initially part of the WWSSN (before 1990 only)
- Stations now processed at the USGS/NEIC (after 1990 only)
- Arrays
- ▲ Stations now run by Australian Geological Survey Organization
- Stations run by Geological Survey of Canada or its predecessors
- * Stations now run by Laboratoire de Detection et de Geophysique, France

Dewey et al.,
2003

ISC Event Bibliography

Close polygon Edit polygon Delete last point Clear map

Lat: -8.252 Lon: -59.238

-17.662,-71.719
-17.662,-68.994
-20.733,-68.994
-23.259,-70.225
-22.774,-71.631
-17.662,-71.719

Plot saved polygon:

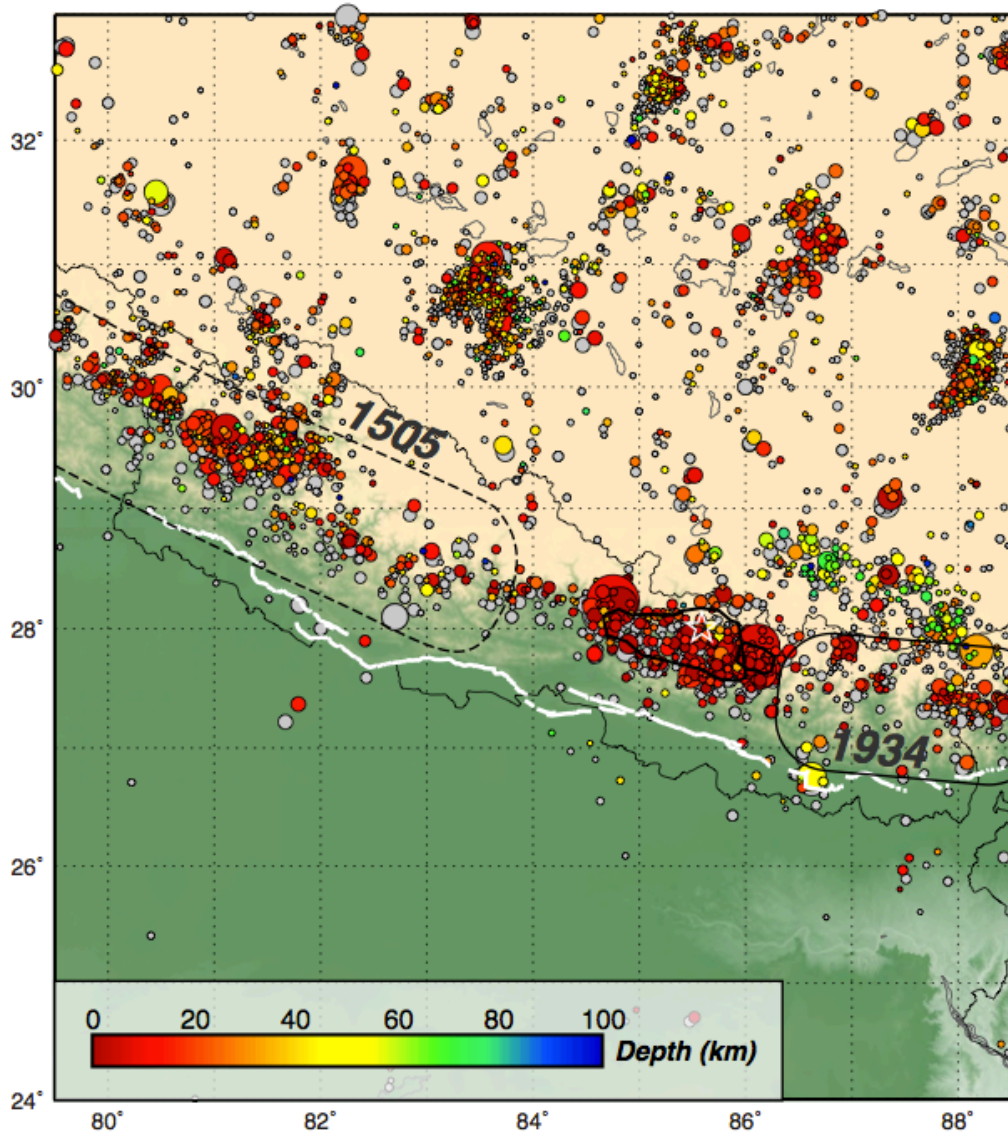
Plot polygon

Map data ©2015 Google, INEGI, Inav/Geosistemas SRL 500 km Terms of Use

Recent studies at NEIC using ISC data

These studies depend on ISC's Relentless collection and curation of historic data. Including the archiving of underlying pick and amplitude data allowing for reproducibility and the application of new and focused techniques.

Relocated Regional Himalayan Seismicity



- Primary data source ISC
 - 1964 to present
 - $M \geq 3.5$
 - 2,246 events
- Bayesian multi-event relocations
 - regionally anchored
 - absolute framework
 - absolute uncertainties
- Helps define the fault geometry
 - Improves shaking estimates
 - Constrains stress transfer
 - Helps define future hazard

Hayes et al., submitted

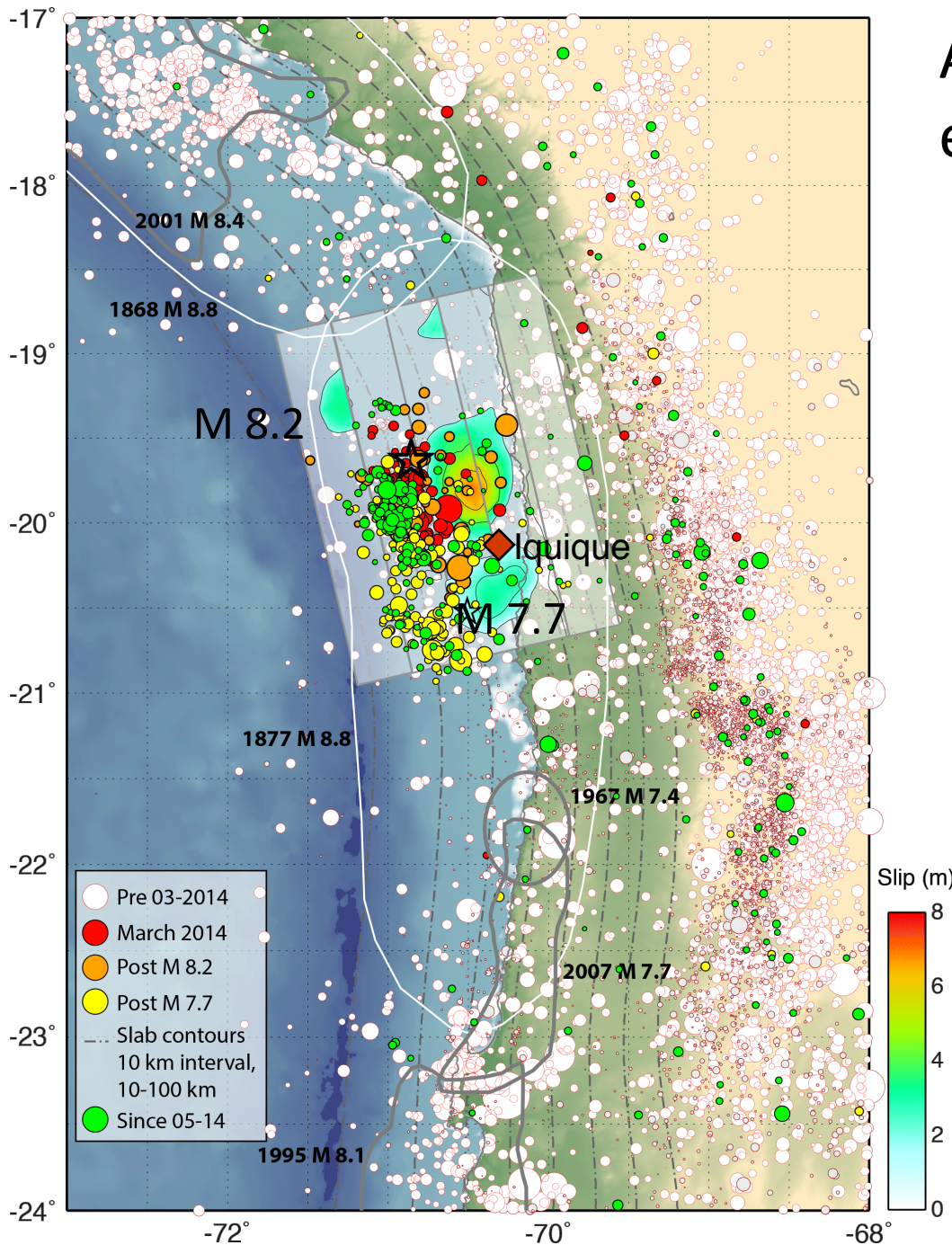
Analysis of 2014 Iquique earthquake sequence

Relocation of primarily ISC curated data 1964 to present

2014 Iquique EQ sequence - in a seismic gap, but not gap-filling.

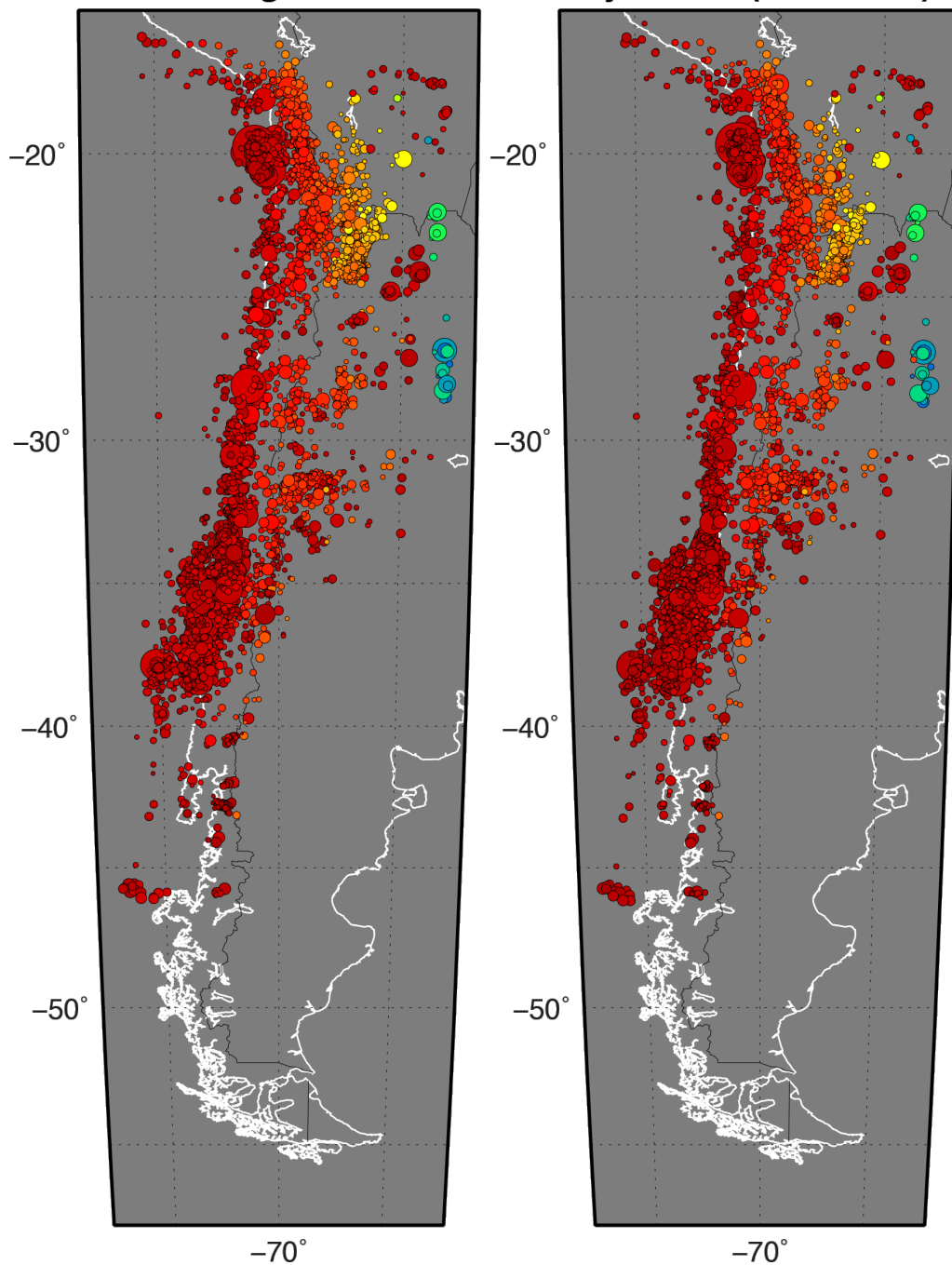
Sequence shows evidence for cascading stress transfer response.

Large enough sections of gap remain for more M8+ EQs (south of 2014; north of 2014; up dip of 2014?)



Original

Bayes_Loc (1964-2014)



Improving Global Earthquake Relocations using ISC data

NEIC is beginning the process of relocating the global EQ catalog from using Bayes-Loc; providing improved, multi-event informed EQ locations within a Bayesian framework.

Provides quantified location uncertainties.

Bayesian framework permits use of a priori information from alternate, local and regional based relocation efforts (e.g., Maule, Iquique sequences).

Initial versus Final Location: Distance

Explanation

Distance Adjusted (km)

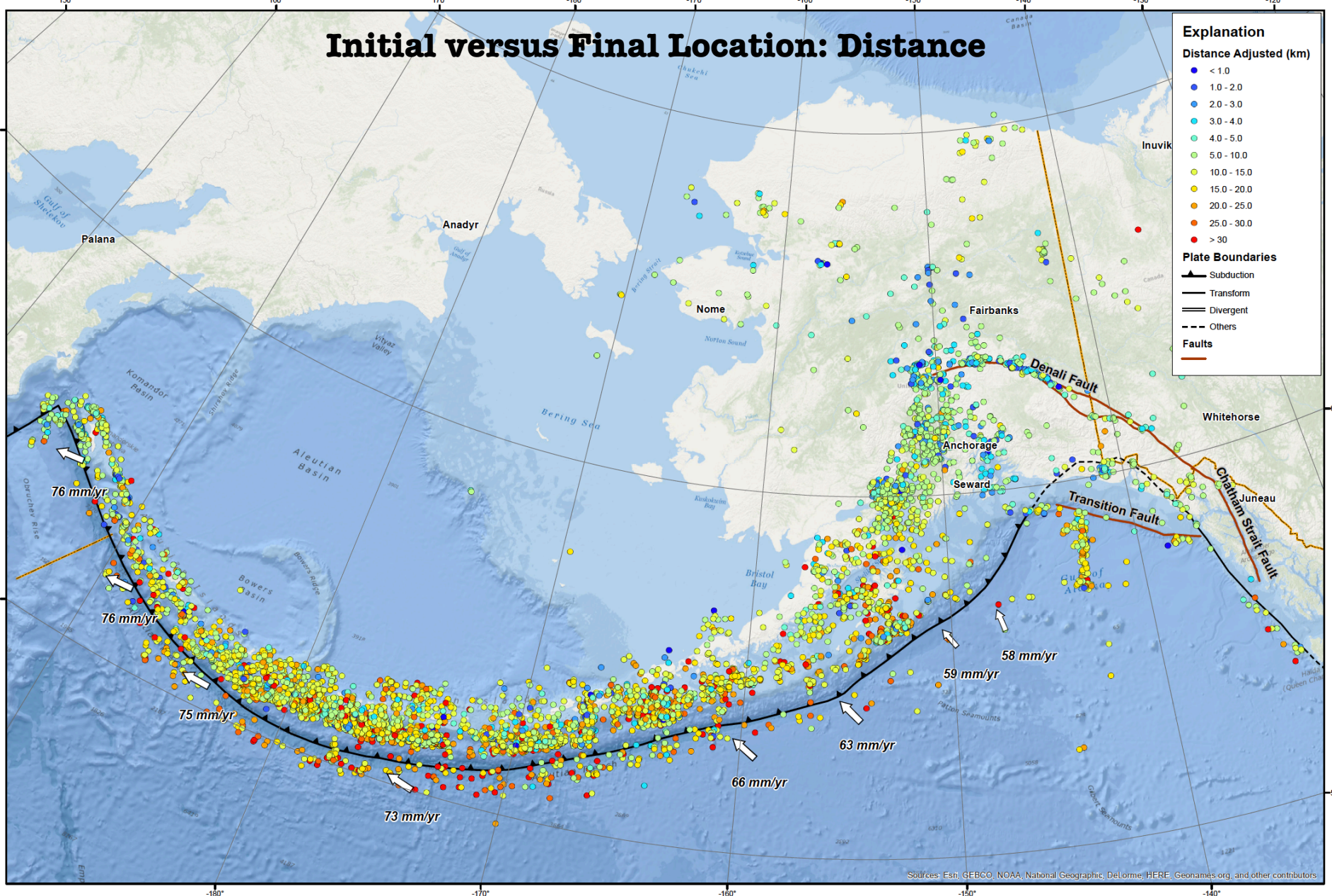
- < 1.0
- 1.0 - 2.0
- 2.0 - 3.0
- 3.0 - 4.0
- 4.0 - 5.0
- 5.0 - 10.0
- 10.0 - 15.0
- 15.0 - 20.0
- 20.0 - 25.0
- 25.0 - 30.0
- > 30

Plate Boundaries

- Subduction
- Transform
- Divergent
- Others

Faults

- Denali Fault
- Transition Fault
- Chatham Strait Fault



Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org, and other contributors

Thank you ISC and those that
contribute