



Distributed Acoustic Sensing

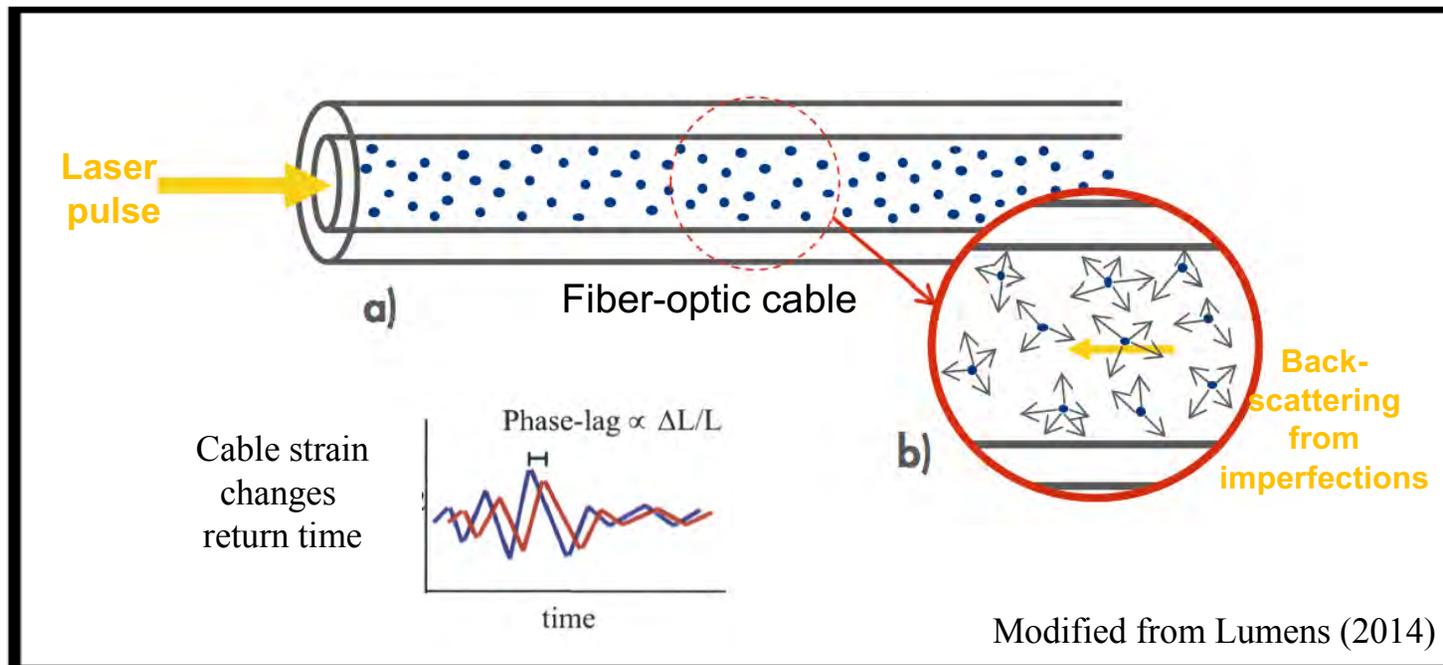
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Southern California Earthquake Center

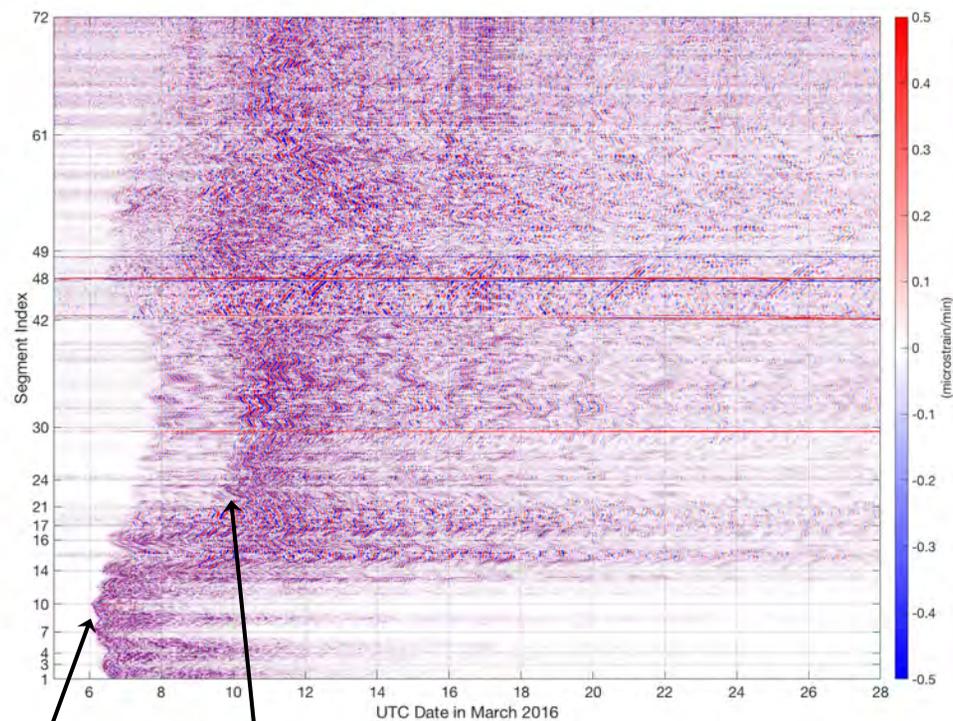
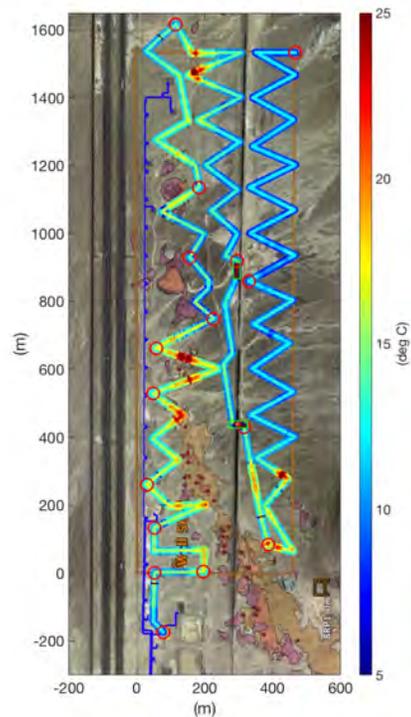
Research Priorities: New Data Sources

Distributed Acoustic Sensing (DAS): Nanosecond laser pulses are emitted at tens of kHz repeat rate into a fiber-optic cable, and back-scattered returns are detected. Changes in return time due to strain in the cable, typically averaged over 10 meters of cable length, caused by passing seismic waves, are measured to give a high-resolution of ground strain as sensed by the cable.



Examples of DAS data - local microearthquake

Local micro-
earthquake
~1 km to the
SW



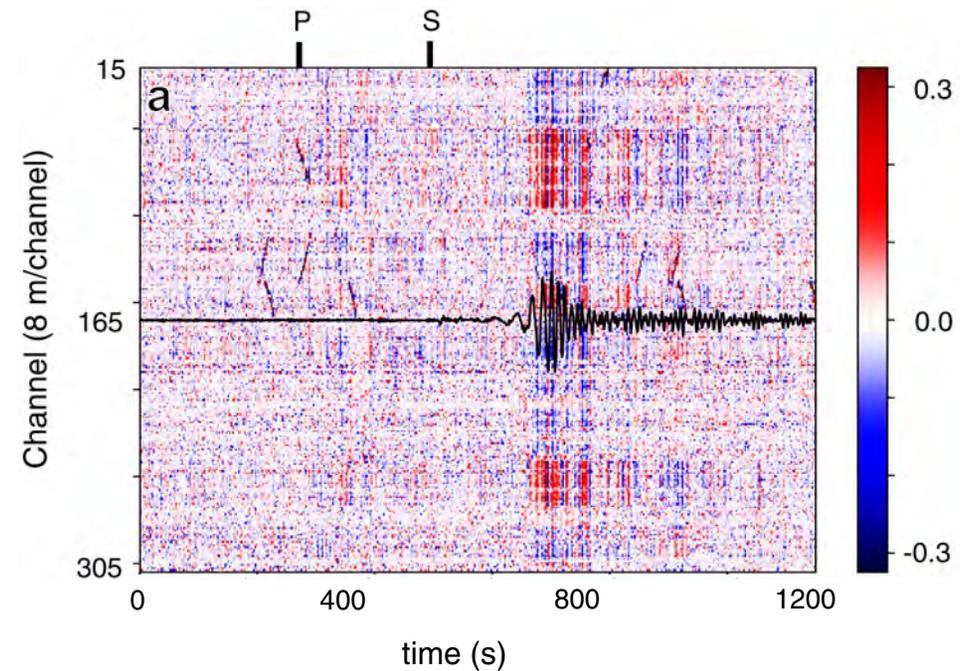
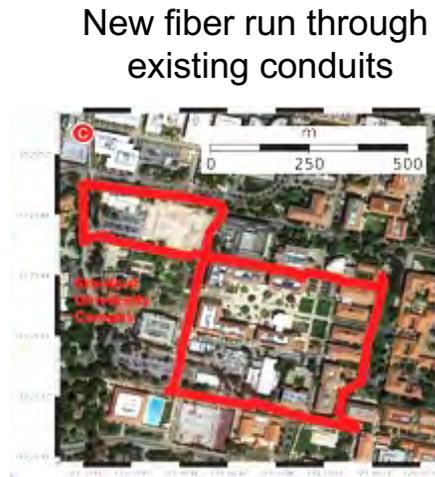
P wave

S wave

Silixa iDAS

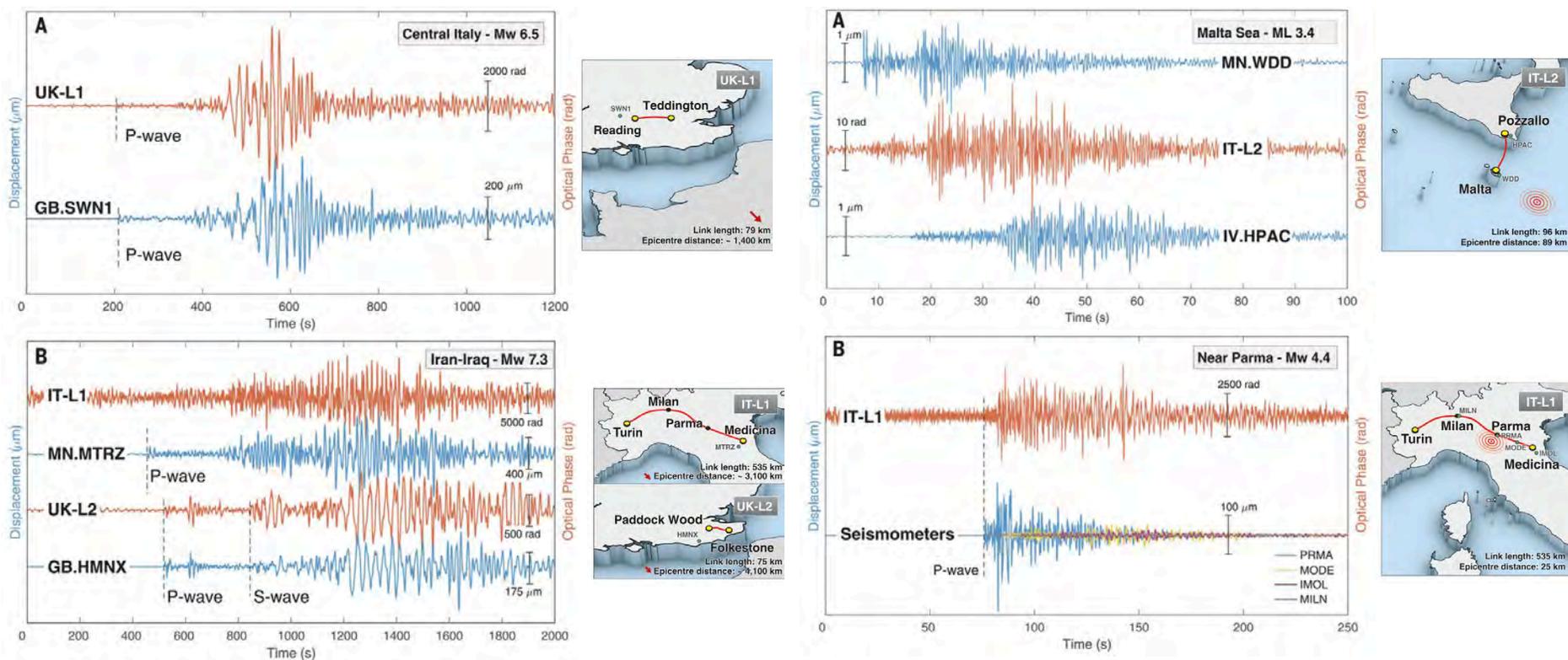
Examples of DAS data - regional earthquake

Stanford DAS array observation of the 13 September 2016 Pawnee, OK, M 5.8 earthquake plotted with a horizontal component recording from nearby NCSN broadband station JRSC



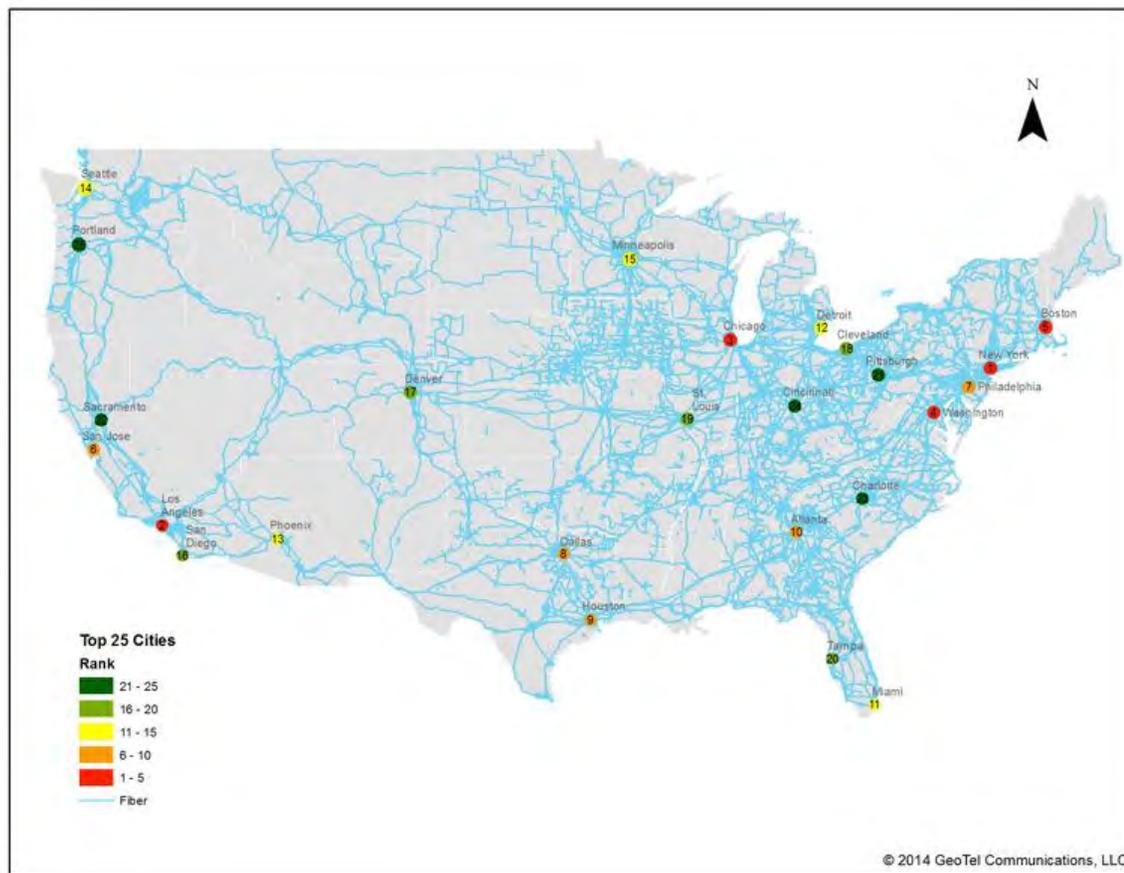
Lindsey et al. (GRL, 2017)

Examples of DAS data - regional, teleseismic, local



(Marra et al., Science, 2018)

Example of most fiber-connected cities in the US



LA is #2

NY is #1

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