ID: Type: **Oral**

for Coping with Large Aftershock Sequences

Aftershock sequences following major earthquakes present great challenges to seismic bulletin generation. The analyst resources needed to locate events increase with increased event numbers as the quality of underlying, fully automatic, event lists deteriorates. While current pipelines, designed a generation ago, are usually limited to single passes over the raw data, modern systems also allow multiple passes. Processing the raw data from each station currently generates parametric data streams that are later subject to phase-association algorithms which form event hypotheses. We consider a major earthquake scenario and propose to define a region of likely aftershock activity in which we will detect and accurately locate events using a separate, specially targeted, semi-automatic process. This effort may use either pattern detectors or more general algorithms that cover wider source regions without requiring waveform similarity. An iterative procedure to generate automatic bulletins would incorporate all the aftershock event hypotheses generated by the auxiliary process, and filter all phases from these events from the original detection lists prior to a new iteration of the global phase-association algorithm. We demonstrate proof-of-concept using the 2015 Gorkha sequence, Nepal, recorded on IMS stations.

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Track Classification: 3. Advances in sensors, networks and processing