SnT 2025 CTBT: SCIENCE AND TECHNOLOGY CONFERENCE
8 SEPTEMBER ONLINE DAY
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Yield and Depth of NTS/DPRK Explosions Inverted from Regional Seismograms Using a New Algorithm

LIGHTNING TALK

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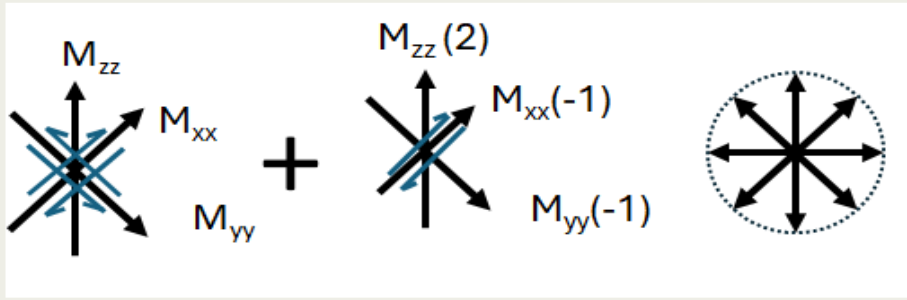
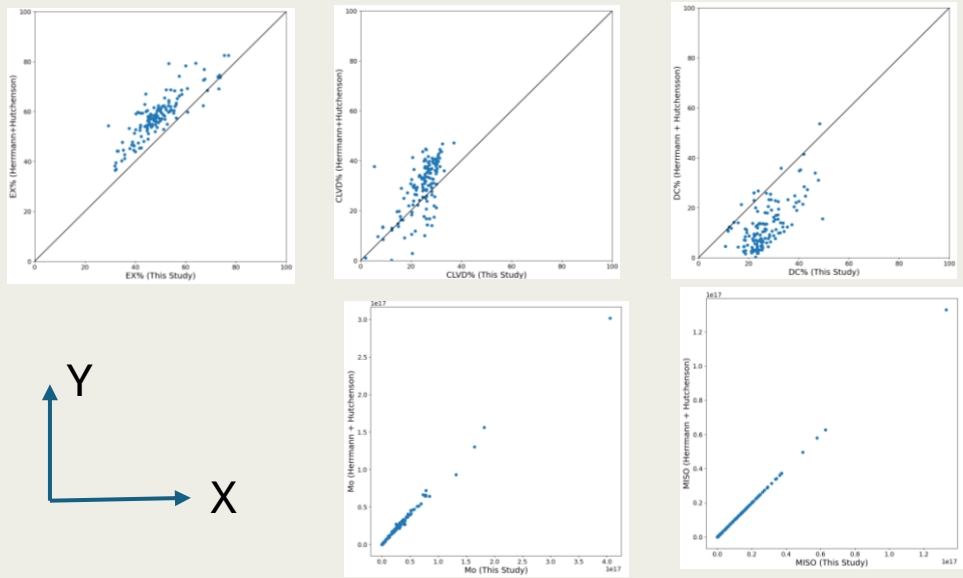
- Constrains on the formulae used by Minson and Dreger (2008) which are based on Herrmann and Hutchenson (HH,1993)
  - (i) **EX, DC** and **CLVD** occur at the same depth
  - (ii) Algorithm starts with the same diagonal **MT** (moment tensor) elements for **DC, CLVD** and **EX** sources
  - (iii) Diagonal **GFs** are same for both **CLVD** and **EX** sources: Z**DD & RDD** for **CLVD** and **ZEX & REX** for **EX**.
  - (iv) Seismic waves propagate to the receivers as an effective source from the point of detonation
- Constraints (ii) & (iii) allow **GF**s of three sources to add up linearly.
- Essentially, HH formulation is equivalent to adding diagonal $\frac{ZDD}{3}M_{ii}$ for the **CLVD** and $\frac{ZEX}{3}M_{ii}$ for the **EX** to diagonal elements of the **DC** source (Langston, 1981; Saikia & Herrmann, 1986).
- Constraints (i),(ii), (iii) and (iv) are not necessarily true.
- This study assumes the sources to act independently of each other, and constraint (i) is eliminated.
- Seismic waves from **DC, CLVD** and **EX** sources propagate and get added at the receiver linearly.





X: This Study
Y: Herrmann & Hutchenson (1993)