Back-arc thrusting in the Jakarta basin

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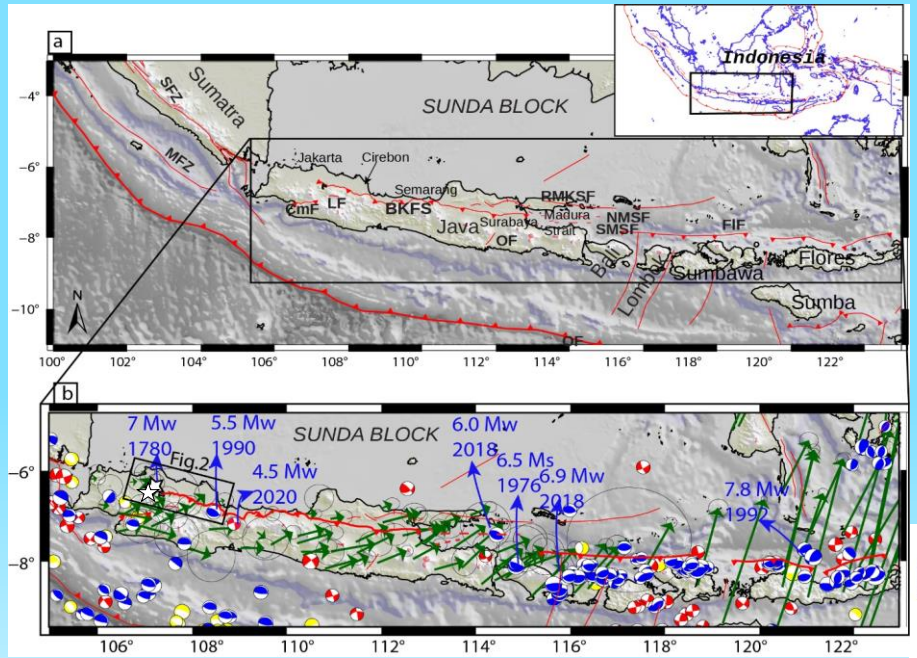
Introduction



GPS velocity data : Koulali et al., (2017), Focal mechanism data : GCMT, Ekstrom et al. (2012)

Aribowo et al (in review, Tectonics)

Front View of Buitenzorg Palace (Bogor) during the Earthquake of 10 October 1834, Willem Troost (II), 1834 - 1836

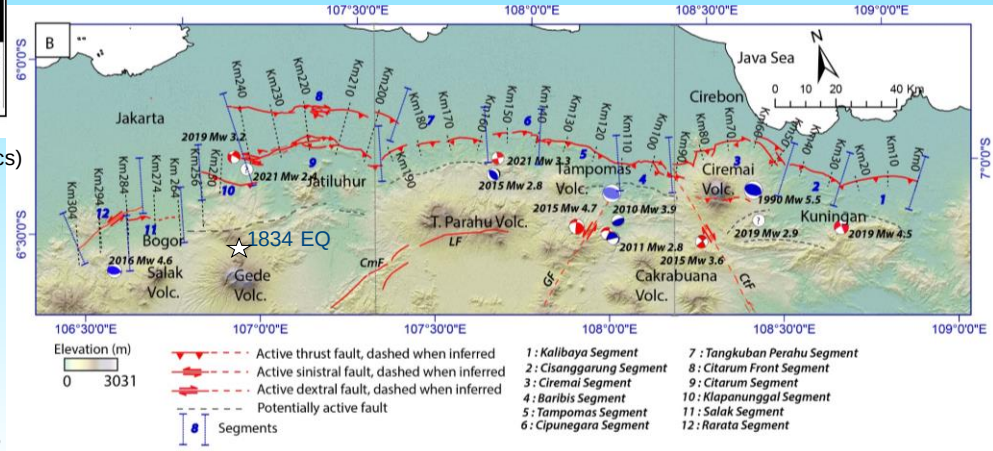
6.9 Mw Lombok back-arc thrust earthquake event in 2018 (Yang, et al., 2020)

There is major back-arc thrust fault in the northern part of Java Island (e.g.Simandjuntak & Barber, 1996)

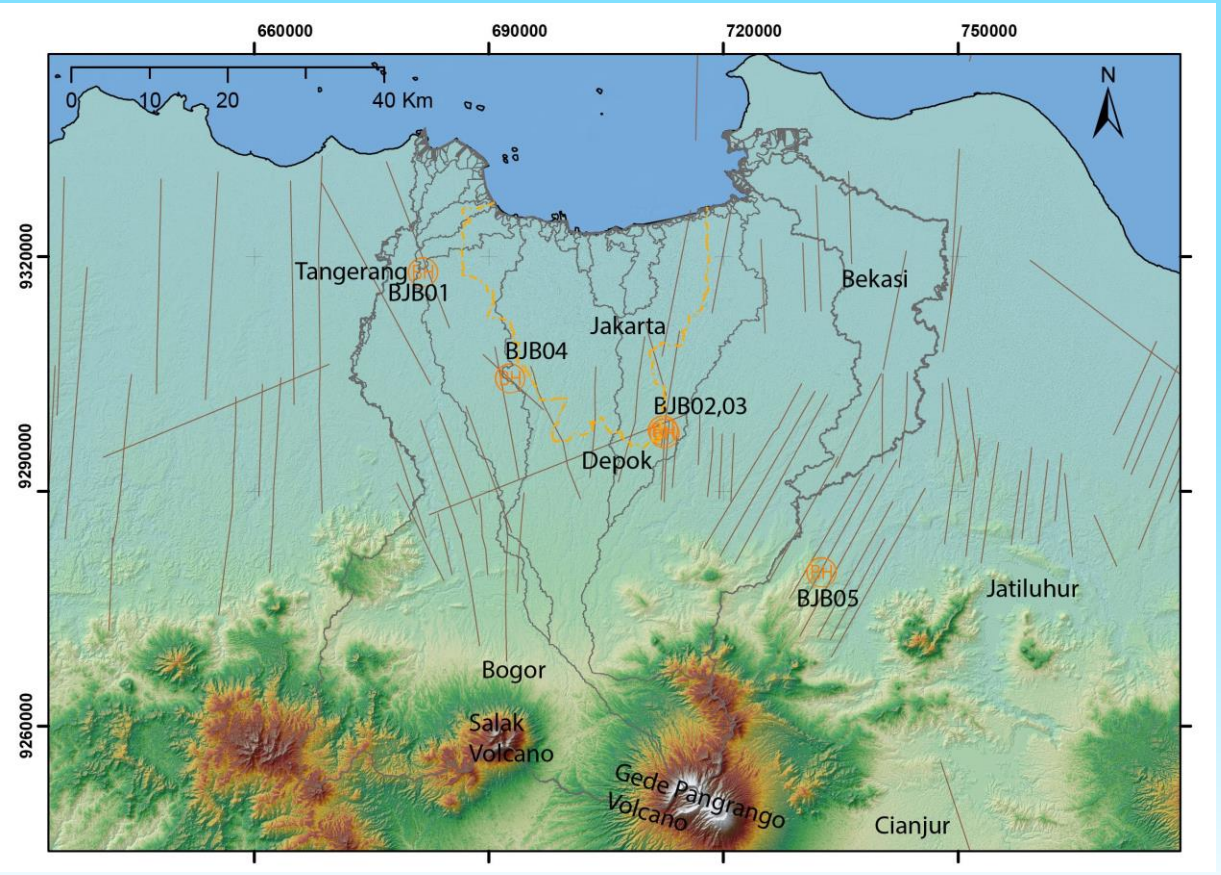
Active fault studies based on geodetic and seismology show that the fault is active (e.g. Koulali et al, 2017; Supendi et al; 2018)

Back-arc thrust propagation to West Java (Aribowo et al, in review)

Does the active back-arc thrust threats Jakarta?

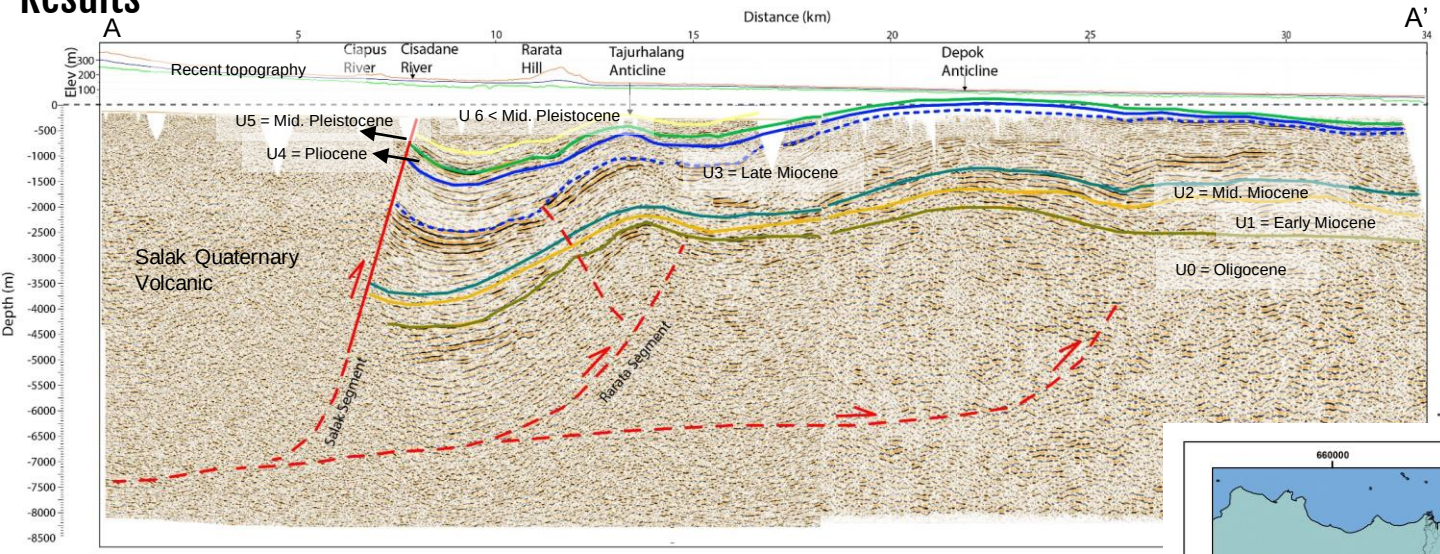


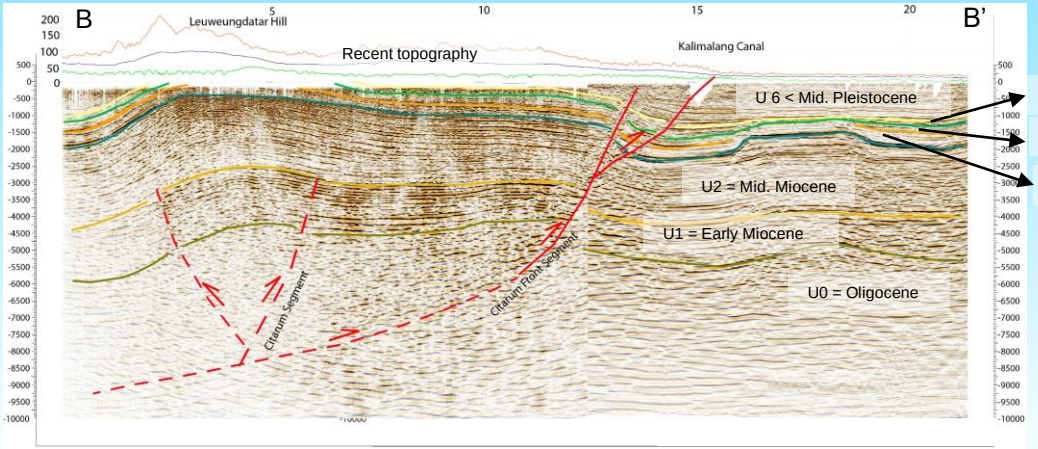
Data & Methods

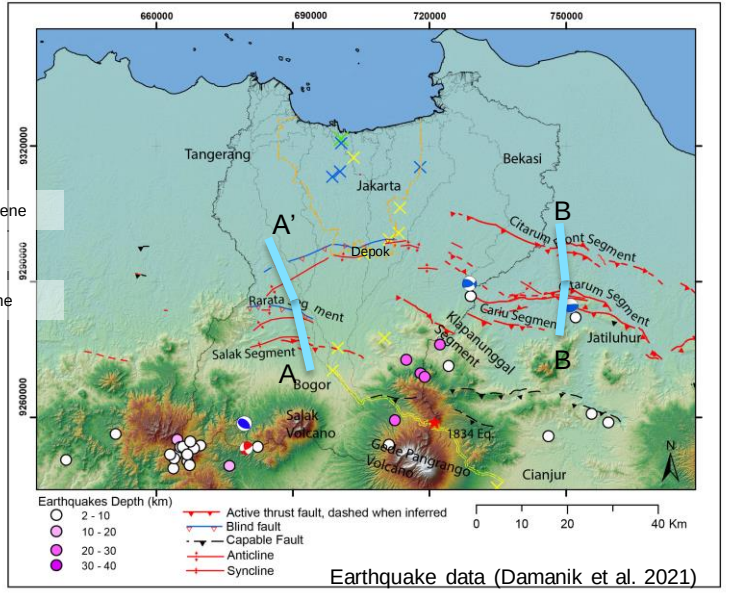


- DEM analysis (30-m, 8-m, 2-m resolutions)
- Seismics reflections interpretations, aided with borehole data (courtesy of Pusdatin, ESDM, Indonesia)
- Time structural map vs sedimentation rate map to see the timing of the structure and history of the Jakarta Basin

Results







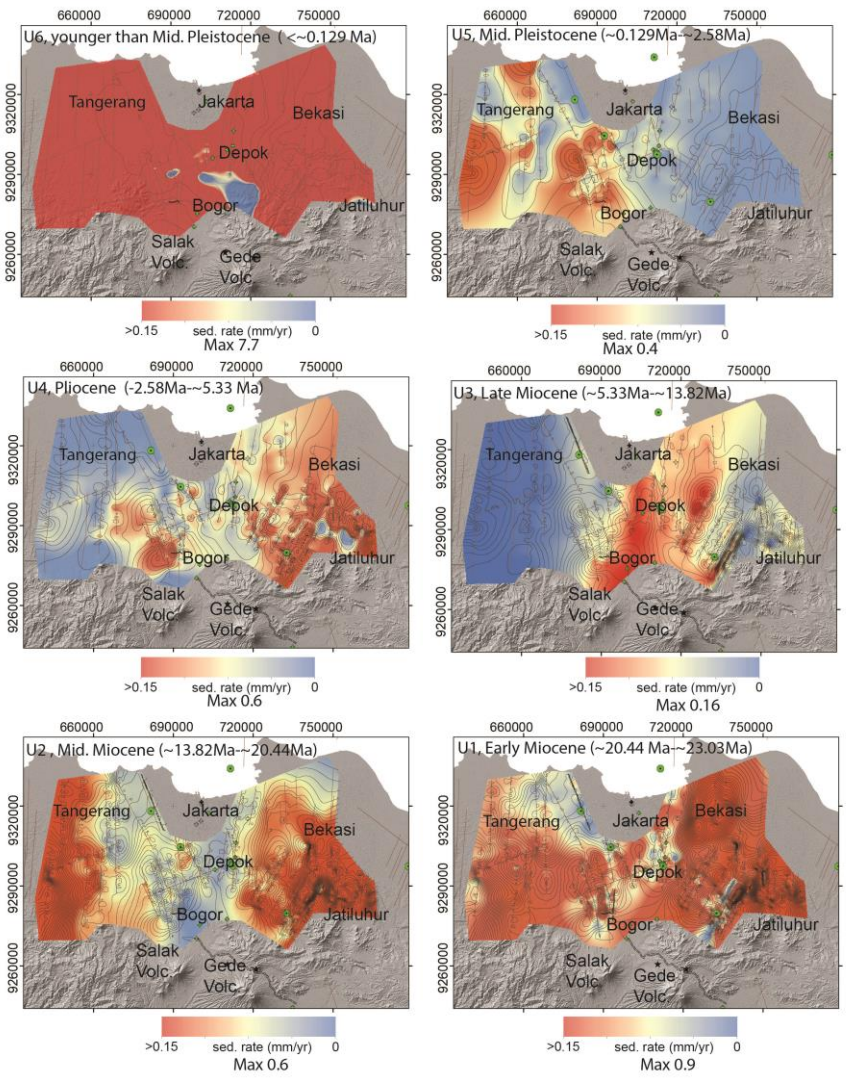
- Syn-tectonic sedimentation of the bottom part of U3 (Late Miocene) → Initiation of Salak thrust segment
- Propagation northward occurred in the middle of Late Miocene
- The thrust and blind thrust affect the recent topography
- The thrust activity is less in the western part of Jakarta

Seismic data courtesy of Pusdatin ESDM, Indonesia

Earthquake data (Damanik et al. 2021)

Results

- U1= high sedimentation rate, structural highs in the Jakarta, Tangerang region and lows in Bekasi and Bogor
- Sedimentation fill the Depok Low after Middle Miocene (U3)
- The end of Late Miocene-Pliocene : E-W structure propagate westward, initiation of Depok antiform, shortening of the Bogor area
- High sedimentation rates after Mid Pleistocene-Recent, except in the small region around Depok antiform
- Tectonic activity is less in the western part of Jakarta in the present day



To conclude

- Propagation westward has occurred in the Late Miocene and is still active until recent
- Northward propagation initiated in the upper Late Miocene
- Folding related blind-thrust in the Jakarta Basin
- Back-arc thrust fault system been active since Late Miocene to recent

- The work for calculating the uplift rate and slip rate is still ongoing

Thank you for your attention !

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