Facies architecture, stratigraphic evolution and tectonic history of the Miocene alluvial fan of Batu Arang

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Three lines of evidence suggest that basin development of the Tertiary Batu Arang Basin, at least during the deposition of the Boulder Beds (Miocene to Pliestocene), were controlled by the development of contemporaneous fault system, with deposition exceeding subsidence.

Evidence 1: The facies organisation of the Boulder Beds shows that distal, subaerially deposited and oxidised, orthconglomeratic, stream flow alluvial plain facies is overlained by proximal, subaqueously deposited and reduced debris flow, dark gray paraconglomeratic facies. This may indicate a basinward movement of the source area.

Evidence 2: The red orthoconglomeratic unit is separated from the overlying gray paraconglomeratic unit by an intrabasinal angular unconformity which overlies a distinct palaeosol horizon. This suggest that Red Conglomeratic Unit and the Gray Conglomerate Unit are deposited in distinctly different, temporally separated basins.

Evidence 3: The structural styles exhibited by the Red Conglomeratic Unit and the Gray Conglomeratic Unit are distinctly different. The red conglomeratic layers show wavy or undulating beds and also localised warping, while the upper gray conglomerate layers are almost flat bedded. This suggests that different tectonic regimes operated before, during and after the deposition of these units.

These evidences suggest that the Boulder Beds were deposited in a tectonically active basin.