Tectonic significance of the Buldya Group, Western Australia

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The Buldya Group contains, in ascending order, the Townsend Quartzite and the Lefroy, Browne, Hussar, Kanpa, and Steptoe Formations. The Lefroy and Browne Formations are probably lateral equivalents. The Ilma Formation and Mason Conglomerate are included also, although their stratigraphic level within the group is uncertain. The group comprises siltstone, mudstone, sandstone (in part quartzite), dolomite (commonly stromatolitic), and halite and other evaporite minerals. In core, rocks of the group are commonly chocolate brown or light ferrous green, with pink and red-tinted evaporites. Evaporites have been intersected in drillholes, but are not known in outcrop. Halotectonics, due to thick evaporites in the lower Browne Formation, appear to be a major structural control, if not the dominant control, in the Officer Basin (Simeonova and Iasky, 2004).

The Buldya Group is known from drillhole and seismic data, scattered isolated outcrops on COOPER, TALBOT, and BENTLEY 1:250 000 map sheets in the west Musgrave region, and WARRI, MADLEY, ROBERT, THROSSELL, and NEALE elsewhere across the southern Officer Basin. The most extensive outcrops are east of Lake Disappointment and in Constance Headland, where major cauliflower-like structures visible on satellite imagery suggest large scale salt expulsion. The group underlies Phanerozoic rocks or Cenozoic cover throughout much of the southwestern Officer Basin, and was intersected in a series of petroleum and stratigraphic drillholes (Perincek, 1998) that include: Browne 1 and 2, Dragoon 1, Hussar 1, Kanpa 1A, Lungkarta 1, Yowalga 2 and 3; Bureau of Mineral Resources (BMR, now Geoscience Australia (GA)) drillholes Madley 1, Talbot 1, 3, and 4, Throssell 1, and Warri 20; GSWA Empress 1 and 1A, GSWA Lancer 1, and deep mineral drillholes Kennecott N1 1, WMC NJD 1, and 92 THAC 001.

It is difficult to estimate the thickness of the group because of the poor outcrop, and because it is deeply eroded in places. The group is at least 4500 m thick as estimated from maximum observed thicknesses of individual formations, mainly in drillholes, but individual drilled sections range from about 1000 to more than 3000 m thickness.

The age of the Buldya Group as a whole is poorly constrained. It is generally regarded as Cryogenian, with a maximum age of about 850 Ma (Grey et al., 2005), but it is possible the Townsend Quartzite and lower Browne Formation are aproximately 150 million years older. This is based on the absence of a clear unconformable contact between the correlative Heavitree and Dean Quartzites (Amadeus Basin), and the underlying Tjauwata Group at some localities, and the presence of an unconformity within the Bitter Springs Formation (Browne Formation correlative) in parts of the Amadeus Basin. The age of the uppermost Buldya Group is also uncertain as the upper Steptoe Formation is recognised solely on seismic images except perhaps in Vines 1, where the section below 1600 m is probably Steptoe Formation based on the presence of *Cerebrosphaera buickii,* and is possibly conformable with the Pirrilyungka Formation (Sturtian glaciation) above. *(490 words)*

## Reference(s) [Arial 14 pt]

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