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Discussion

Discussion on "Neogene-Quaternary evolution of the Tefenni basin on the Fethiye-Burdur fault zone, SW Anatolia-Turkey. Journal of African Earth Science 118, 137–148" by R. Aksoy, S. Aksarı

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The study by Aksoy and Aksarı (2016); (1) omits key fossil localities resulting in erroneous age estimates for their rock units, and (2) excludes and/or refers incorrectly pre-existing key studies in their research field. As the study is based on no age data, their proposal of NW-SE directed crustal extension that transitions to transtension is flawed. In this comment we summarize pre-existing age data and highlight its vital importance for yielding accurate information on the evolution of the Burdur Basin.

The authors introduce southern part of the Burdur Basin as the 'Tefenni basin' with no supporting evidence for such separation and new basin designation (e.g. basin geometry, depositional architecture based on bed-by-bed measured logging of the basin-fill, palaeocurrent readings and age data). In fact, Price (1989) and Price and Scott (1989, 1991, 1994) documented that the Neogene Burdur Basin comprise Tefenni area with its upper Miocene-upper Pliocene basin-fill succession (The Burdur Formation; Fig. 1). The geological map presented by Aksoy & Aksarı in their Fig.4 basically reproduces the geological map series published by The Geological Survey of Turkey (MTA, the Denizli K9 and Isparta K10 sheets compiled by Şenel, 1997a,b; Fig. 2). Here the frame of their geological map coincides with these 1/100000 scale maps, however it appears that the authors overlooked the northern sheet of Isparta J10 published by MTA (Şenel, 1997c) where the Neogene sediments extend NE-ward into the Burdur Basin. Price and Scott's studies (1989, 1991, 1994) show tilt-block rotations that resulted in compartmentalisation of the Burdur Basin into Quaternary sub-basins where modern lakes Burdur and Karataş are located, and does not indicate the existence of a Tefenni (sub-) basin. Such mechanism has also been evidenced in the adjacent Çameli Basin where the Gölhisar depression (the location of Lake Gölhisar) was resulted in the fault-block rotation caused subdivision of the larger Çameli Neogene Basin. Consequently, the sedimentary succession exposed around Gölhisar is the Çameli Formation, typical of the larger Çameli Basin during Neogene (Alçiçek et al., 2005).

In their map, Aksoy & Aksarı removed the shallow marine Langhian units (units Tmk and Tmkt, that underlay the basin-fill succession in the MTA maps as indicated in the Fig. 2), and included these in the Jurassic-Cratecaeus Beydağları autochthonous (Kb in their Fig.4) without further supporting evidence for the change. However, in the original MTA map (Fig. 2), the Beydağları unit is overlain by the lower Miocene algal limestone and Burdigalian-Langhian shallow marine clastics. The entire succession was thrust by the Eocene foreland units of Lycian nappes after Langhian time and the nappe front was covered by Serravallian shallow marine clastics (Hayward and Robertson, 1982; Hayward, 1984; Collins and Robertson, 1997, 1998, 1999, 2003). These data conflict with a 'middle Miocene' age for the basin fill as proposed by the authors (Fig. 3). We are puzzled that the authors chose to base their basin evolution model on a conference abstract instead of referring to the extensive publications available (e.g. Okay et al., 2001; Alçiçek and ten Veen, 2008; ten Veen et al., 2009; van Hinsbergen et al., 2010; Facenna et al., 2013; Jolivet et al., 2015;

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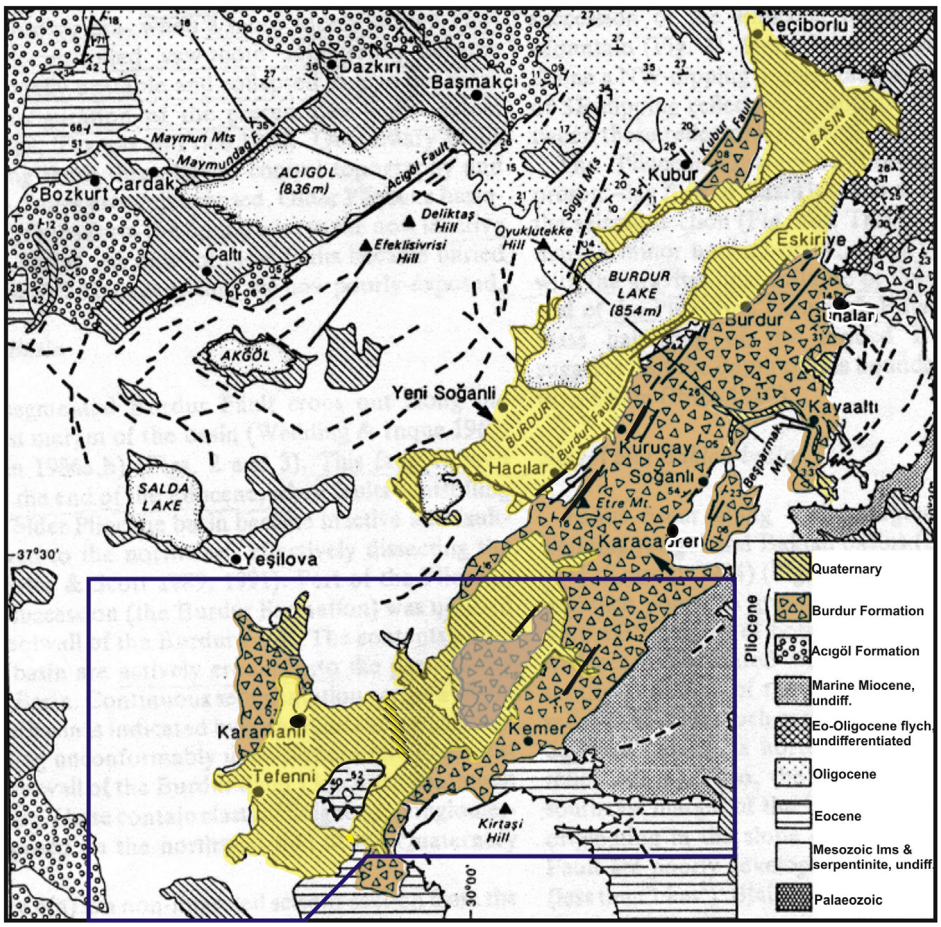

Fig. 1. The geological map of Price and Scott (1994) showing aerial extension of the Burdur Basin over the Tefenni area. The map presented by Aksoy and Aksarı (2016) is delineated by the blue line. Note that the Burdur Basin comprises the Tefenni area. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Göğüş, 2015; Pourteau et al., 2016).

For the onset of the basin-fill phase Aksoy & Aksarı used 'middle', 'middle-late' and 'late' Miocene in their paper. They have ascribed the oldest part of basin-fill succession to the Gölhisar formation with a 'middle Miocene' age following an MSc thesis and a local journal paper where the age determination was based on 'prediction' and 'reinterpretation' but lack actual age data. Such data are readily available for the relevant units based on micro- and macro-mammal biota, covering a late Miocene (MN9-12, Vallesian-Turolian) to early Pleistocene (MN17, Villanyian) timespan (Alçiçek, 2001; Saraç, 2003; Alçiçek et al., 2005; van den Hoek-Ostende, 2015a,b; Jiménez-Moreno et al., 2015; Jimenez-Moreno et al., 2016; Alçiçek et al., 2016). Furthermore, the authors have ignored a radiometric age determination of 4.6–4.0 Ma and 2.77 ± 0,06 Ma-24 ± 2 Ka for volcanic rocks in their succession (Lefevre et al., 1983; Platevoet et al., 2008).

Instead of following unit names from previous extensive geological mapping and lithostratigraphic work on the Burdur Basin region including the Tefenni area (Price, 1989; Price and Scott, 1989, 1991, 1994) Aksoy & Aksarı have re-named the sedimentary units in their work as the Gölhisar, Burdur and Tefenni formations. No reasons for the change are provided (e.g. sedimentary facies analyses along bed-by-bed logging, palaeocurrent readings and age data) and we argue against the introduction of new names without proper consideration of existing names. For instance they ascribe "about 800 m' for the thickness of the Gölhisar formation in the Gölhisar area and refer to a local journal paper that contains no measured log detailing such thickness. The authors also overlooked the sedimentary facies analysis through bed-by-bed logging performed on the succession exposed in the Gölhisar domain of the Çameli Basin where the Çameli Formation was determined to have a maximum thickness of 500 m (Alçiçek, 2001; Alçiçek et al., 2005). For the entire thickness of the Burdur Formation they refer to a conference abstract on seismotectonics, but ignored the bed-by-bed logging by Price (1989) documenting 1100 m of Burdur basin-fill succession. The authors refer to Alçiçek et al. (2005) for the age of their Tefenni formation, but there is not a single word on such formation in that paper. Similarly they refer to Alçiçek (2001) for the age of the Burdur Formation but age data for that unit are lacking in that with.

Aksoy & Aksarı claim that basin evolution of their Tefenni basin coincides with the adjacent Çameli Basin to the southwest. Despite their evolutionary stages based on no age data, the depositional history of the Çameli Basin is constrained by terrestrial mammal fossils which provide a biostratigraphic framework with a regional geodynamic context (Alçiçek, 2001). Development of the Çameli graben initiated in the Vallesian hosting alluvial-fan, fluvial and lacustrine deposits. A second pulse of crustal extension produced new normal faults that split the basin longitudinally into two compartments by late Ruscinian-early Villanyian times when the lake expanded and deepened. The lacustrine setting subsequently shrank as the progradation of axial river deltas and basin-margin

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