



Interactive comment on “Phanerozoic black shales and the Wilson Cycle” by J. Trabucho-Alexandre et al.

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Trabucho-Alexandre and colleagues provide a useful review of the broad-scale controls on black shale formation. Few would argue with their general conclusion that this formation is controlled by "climate, oceanography and basin evolution" but they then go on to stress the role of the final factor and how this is dependent upon the stage of the Wilson Cycle. I think they have got their list in the correct order, with climate as the first order control. They also lament the use of "uniformitarian, oversimplified models" in black shale interpretation and particularly single out the unfortunate influence the present-day Black Sea has had in this regard. In fact, the extreme end-member topography of the Black Sea has long been recognized and few if any have applied it as a direct analogue. The take-home message from this basin is the importance of

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restricted lateral advection and a positive water balance (Hallam & Bradshaw 1979; Demaison and Moore 1980).

I am unclear how the "stratigraphic clustering" of black shales (i.e. the temporal restriction of widespread black shale deposition to short time intervals, often called oceanic anoxic events, OAEs) can be related to the slow progression of the Wilson Cycle. Thus, they relate the Cenomanian-Turonian black shales to the favourable conditions of the Wilson Cycle but these conditions surely occurred throughout these two Cretaceous Stages whilst widespread black shale deposition was temporarily restricted to the stage boundary interval? The key variable here is climate (Jenkyns 1999), although regional factors, related to the stage of continental rifting undoubtedly controlled the local expression of this OAE. Over-reliance or over-emphasis on the role of basin evolution runs the risk of failing to predict the occurrence of some of the most widespread black shale occurrences. For example, the Toarcian OAE occurred at the zenith of Pangean accretion and yet their Wilson Cycle model predicts black shale formation should be later during the initial stages of break up.

The observation that "Widespread black shale deposition is not favoured in mature ocean basins" is again derived from an over-simplified adherence to the primary role of basin evolution. I beg to differ. They might like to consider black shale deposition in the mature Panthalassan Ocean in both the early Triassic and early Jurassic, both occurrences of which are linked to climatic factors, notably global warming (Wignall et al. 2010).

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