



Constraints on the application of the TEX86 temperature proxy in the Mediterranean

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Since its introduction in 2002 (Schouten et al., 2002) the TEX86 index has become an increasingly used sea surface temperature (SST) proxy. Like with many proxies its application in different settings has limitations, but on a global scale from polar to tropical settings it corresponds well with SST (e.g. Kim et al. 2010). The TEX86 is particularly useful in combination with the UK'37 proxy as they very often offer complementary seasonal or stratigraphical information (e.g. Leider 2010, Huguet et al 2006).

Very few studies have been performed so far in the Mediterranean as in general its sediments present large terrestrial inputs and some areas show methanogenic activity, both of which can be deterrents for the use of the TEX86. A recent study in the southern Italian shelf by Leider (2010) found a relatively strong correlation between TEX86 temperatures and depth. These authors suggested that coastal TEX86 is biased by a soil organic matter input that modifies the original summer TEX86 signal. In our study we assess whether this soil and seasonal bias is a basin wide phenomenon and try to establish the end-members of the proxy and the origin of the bias through the integrated study of soil, river and marine water and sediments.

Our results also show a strong positive correlation between TEX86 values and water depth (from the shelf to 2500m) in samples from the North western Mediterranean area. The increasing TEX86 values with depths may be due to a seasonal and/or terrestrial input bias (Leider et al 2010), however deep water TEX86 signal and in situ production should also be taken into account. Terrestrial input can be assessed with the BIT proxy for soil organic matter as well as n-alkane distribution and abundance. Analysis of our data established that soil input may be the main factor explaining this strong correlation. However seasonality and other factors also play a role.

This study confirms that indeed a terrestrial bias in TEX86 may be widespread in the Mediterranean. This has implications for the use of TEX86 as a SST proxy in this study area as cores obtained close to coastal areas will have a strong cold imprint caused by terrestrial input that will mask the real in situ SST record. Thus, future studies will need contrast TEX86 results with both soil input proxies and UK'37 to discard any possible bias.

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