



## **Clay mineral distribution over the North American continent and Northern Gulf of Mexico: Sources, transport and depositional processes.**

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The Gulf of Mexico is a key area for the global thermohaline circulation and for the global climatic system. During the last glacial cycle, the hydrology of the Gulf of Mexico was influenced by successive meltwater pulses resulting from the decay of the Laurentide ice-sheet. Although the direct effects of these freshwater supplies on the paleoceanography of the Gulf of Mexico have been largely studied using  $\delta^{18}\text{O}$  variations (e.g. Aharon, 2003), the associated terrigenous inputs were poorly investigated while they could give informations on both the origin and the dynamic of these events.

Clay minerals seem to be the ideal proxy for such kind of study. They are mainly continental-derived and record both transport and depositional processes (Biscaye, 1965). However, a precise overview of the present-day source, transport and depositional processes for the main clay minerals over the North American continent and toward the Gulf of Mexico has to be done before any further investigation on sedimentary series.

We generate different distribution maps of the four dominant clay minerals (Smectite, Illite, Kaolinite and Chlorite) on both the North American continent and Northern Gulf of Mexico using newly acquired data as well as previously published and unpublished data (Sionneau *et al.*, submitted).

According to these maps, the United States can be divided in four great clay-mineral

source areas: (1) the north-western Mississippi River watershed (Smectite rich), (2) the Great Lakes area and eastern Mississippi River watershed (Illite and Chlorite rich), (3) the south-eastern United States (Kaolinite rich) and (4) the Rio Grande River and south-western Mississippi River watersheds (Illite and Kaolinite rich).

Comparison of the continental vs. marine clay minerals distribution suggests that the clay fraction of the Northern Gulf of Mexico sediments are mainly delivered by the Mississippi River whereas Apalachicola and Rio Grande rivers only have local influences. Our data indicate that the clay-mineral distribution in surface sediments of the actual Gulf of Mexico is strongly influenced by depositional processes as differential settling and oceanic current transportation. Moreover, an evidence of a selective winnowing caused by the Loop Current can be seen in the clay sediments of the De Soto Canyon.

#### References

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