

## Palaeo-CO<sub>2</sub> variation trends and the Cretaceous greenhouse climate

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The Cretaceous was one of the most remarkable periods in the geological history, with a “greenhouse” climate and several important geological events. Reconstructions of atmospheric CO<sub>2</sub> using proxies are crucial for understanding the Cretaceous “greenhouse.” In this paper we summarize the major approaches for reconstructing CO<sub>2</sub> based on palaeobotanical or geochemical data, and synthesize the CO<sub>2</sub> variations throughout the Cretaceous. The results show that atmospheric CO<sub>2</sub> levels remained relatively high throughout the Cretaceous, but were lower in the early Cretaceous, highest in the mid-Cretaceous and gradually declined during the late Cretaceous. However, this overall trend was interrupted by several rapid changes associated with ocean anoxic events (OAEs) and the end-Cretaceous event. New data on paleo-CO<sub>2</sub> levels from palaeobotanical and palaeosol evidence support not only the overall trends indicated by geochemical models, but provide more precise records of the short-term fluctuations related to brief episodes of climate change. Temporal resolution within the long quiet magnetic period in the middle Cretaceous is one of obstacles preventing us from a more comprehensive understanding of the CO<sub>2</sub> climate linkage. But new palaeo-CO<sub>2</sub> determinations and climatic data from stratigraphic sections of sediments intercalated with datable volcanic rocks will allow a better understanding of the relationships between fluctuations of atmospheric CO<sub>2</sub>, climate change, and geological events.

### References

Wang Y, Huang C, Sun B, Quan C, Wu J, Lin Z, 2014. Paleo-CO<sub>2</sub> variation trends and the Cretaceous greenhouse climate. *Earth-Science Reviews*, 129:136-147