

The age of the Lower Watrous red-beds, which host hydrocarbon reserves in the Williston Basin, along with equivalent formations in Manitoba (Lower Amaranth Formation) and the U.S.A. (Saude Member of the Spearfish Formation) is a controversial subject, with this succession being assigned ages from Mississippian to Middle Jurassic; a timespan of over 150 million years. Using existing published data and new geochemical analyses on the Watrous Formation, we present a Triassic age for the Lower Watrous red-beds.

An established well-log correlation dates the Saude Member red-beds as post-Middle Permian. Some previously published geochemical and palynological data from equivalent formations are in agreement with this age, but several palaeomagnetic studies have provided conflicting results, with age assignments of Mississippian through to Late Triassic. Our study demonstrates the equivalency of the Saude Member and Lower Watrous red-beds by extending the well-log correlation north, from the U.S.A. into Saskatchewan. The combined new strontium, sulfur and oxygen isotopic analyses of isolated Lower Watrous anhydrite nodules are most consistent with an Early or Late Triassic age, which is in agreement with the well-log correlation and potassium-argon dating of a pre-red-beds impact structure. A Pennsylvanian age for the Lower Watrous red-beds is considered most unlikely.