Lithostratigraphy of the Msauli Chert in the Barberton Greenstone Belt, South africa.

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The 3.2 Ga Msauli Chert (Stanistreet et al., 1981) in the uppermost Onverwacht Group of the Swaziland Supergroup, the Barberton Greenstone Belt, eastern South Africa, has been identified as one of the least-metamorphosed, best-preserved sequences representing submarine hydrothermal systems in the Archean. In order to reconstruct hydrothermal systems in the Archean ocean, we did detailed geologic mapping and sampling of Msauli Chert for various types of analyses. Here we present out preliminary results.

Based on our field observation and petrographic investigation of thin sections, we divided the Msauli Chert into three lithologic members in ascending order; (1) Altered Volcanics Member (23m thick) is composed of highly silicified greenish volcanic rocks, and characterized by bedding-subparallel quartz veins that are cut by black chert veins containing globular carbonaceous grains. (2) Pale Green Tuff Member (22m thick) is composed of well stratified, silicified pale greenish tuff and 3-10cm-thick shale units. This member includes beds of graded accretionary lapilli and cross lamination that are crosscut by black chert veins. (3) Black Chert Member (more than 52m thick) is composed of black chert and siliceous shale with thin BIF, and black-white banded chert. Massive and laminated black chert occur in this member, but both contain globular carbonaceous grains that are similar to those found in the black chert veins of the Altered Volcanics Member.

Similar lithology between black chert and black chert vein suggests that the black chert vein might have supplied carbonaceous matters of unknown origin to the ocean floor. Occurrences of intensely altered zones suggest active hydrothermal activity during sedimentation of the black chert. We aim to understand the origin of the carbonaceous matters in black chert and the relationships between hydrothermal activity and potential microbiological activity in the Archean ocean floor.