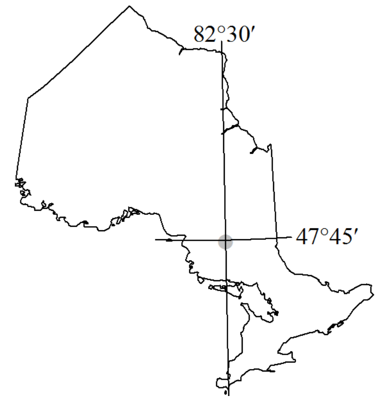
35. A Potential Erosional Unconformity in the Swayze Area, Abitibi Greenstone Belt



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INTRODUCTION

This article presents preliminary results from the Metal Earth 2017 transect research mapping in the Swayze area, during which a unit of polymictic, predominantly clast-supported conglomerate was encountered on the southern part of the transect. The conglomerate covers a large area (at least 500 by 700 m) and, in 1 outcrop, it was visible in contact with a mafic rock. This potential erosional unconformity lies within the Swayze area (Figure 35.1), which is the western extension of the larger Abitibi greenstone belt. This study is part of the multiyear Metal Earth project carried out by MERC (Mineral Exploration Research Centre, Laurentian University, Sudbury) to refine the geological knowledge of the Abitibi greenstone belt. The overall goal of the present study is to characterize the contact relationship between the conglomerate and the underlying mafic unit. The questions to be addressed are: Is the conglomerate of Timiskaming age (~2675–2680 Ma) or is it older? What is the protolith of the mafic unit? Does this contact represent a subaerial erosional surface and, if so, was a weathering profile developed in the underlying mafic unit? Finding the answers to these questions will not only be of importance in establishing a stratigraphy in the Swayze area, but also in shedding light on the nature of the conglomerate and, ultimately, the weathering regime in the Neoarchean.

SITE DETAILS (UTM 388326 5284377)

The outcrop of interest is located along the Doré Road, about 13 km north of the intersection with the Sultan Industrial Road (*see* Figure 35.1). The outcrop dimensions are about 20 m by 6 m (Figure 35.2) and the exposed rock types consist of a dark green mafic rock that is in direct contact with a polymictic conglomerate. The irregular, undulating contact strikes roughly southeast. Southwest of the contact with the mafic rock, the conglomerate is in direct contact with a felsic rock type (*see* Figure 35.2). The mafic rock is defined by an aggregate of chlorite, amphibole and plagioclase, with sparse quartz veining (*see* Figure 35.2). The conglomerate can be traced across many outcrops north and east of the outcrop with the possible unconformity. The mafic unit may be a chloritized mafic volcanic rock, as there is weak evidence of pillow-shaped features.

The polymictic conglomerate has a medium green matrix that in places is white, likely the result of weathering. Typical of Timiskaming conglomerates (e.g., Thurston et al. 2008), the source of both the clasts and the matrix appears to be local; jagged angular fragments up to 70 cm in diameter are next to milled spherical clasts. The matrix of the conglomerate is of similar appearance to the mafic unit. It is populated by a high density of varying clast types. The main clast types include subrounded felsic tonalite; angular and subrounded iron formation (some clasts with jasper and magnetite banding, others of

Summary of Field Work and Other Activities 2017,
Ontario Geological Survey, Open File Report 6333, p.35-1 to 35-4.

more homogenous magnetite); rounded and angular sulphide fragments; black chert or mudstone clasts, both rounded and angular; vein quartz; felsic volcanic rock (mainly angular clasts); angular white tuffaceous clasts; brecciated banded iron formation; accretionary lapilli tuff; and white-and-black-striped quartz-rich clasts. Clast size ranges from less than a centimetre (granules) to nearly a metre (boulders). Felsic clasts make up the majority of the unit, although mafic clasts are found throughout. Angular and rounded clasts are present in nearly equal amounts. The nature of the polymictic unit is chaotic, which, together with the general angularity of the clasts, suggests a very short transport distance for the material. Gravelly and sandy beds occur locally between boulders (Photo 35.1). Unlike the rest of the unit, these beds are well sorted. A sample of a sandy, clast-free bed within the conglomerate was collected for geochronological analysis. Acquiring the age of the youngest zircon from this bed will be an important step in determining the maximum depositional age of these sediments.

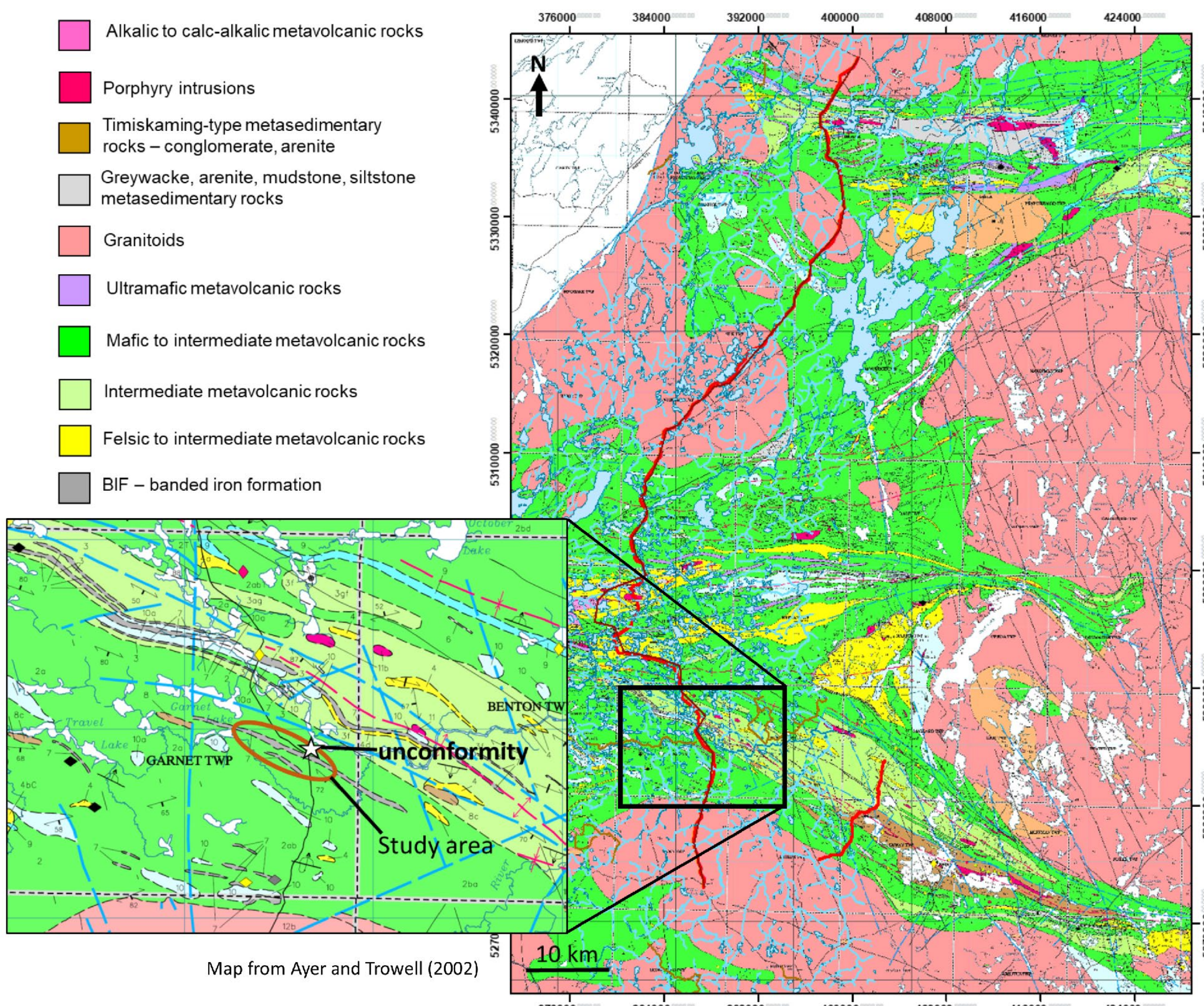

Figure 35.1. Right) Geology of the Swayze greenstone belt (*from* Ayer and Trowell 2002) showing the transect road (in red). **Left)** General geology of the study area (outlined in red), with the location of the possible unconformity. Universal Transverse Mercator (UTM) co-ordinates are provided using North American Datum 1983 (NAD83) in Zone 17.

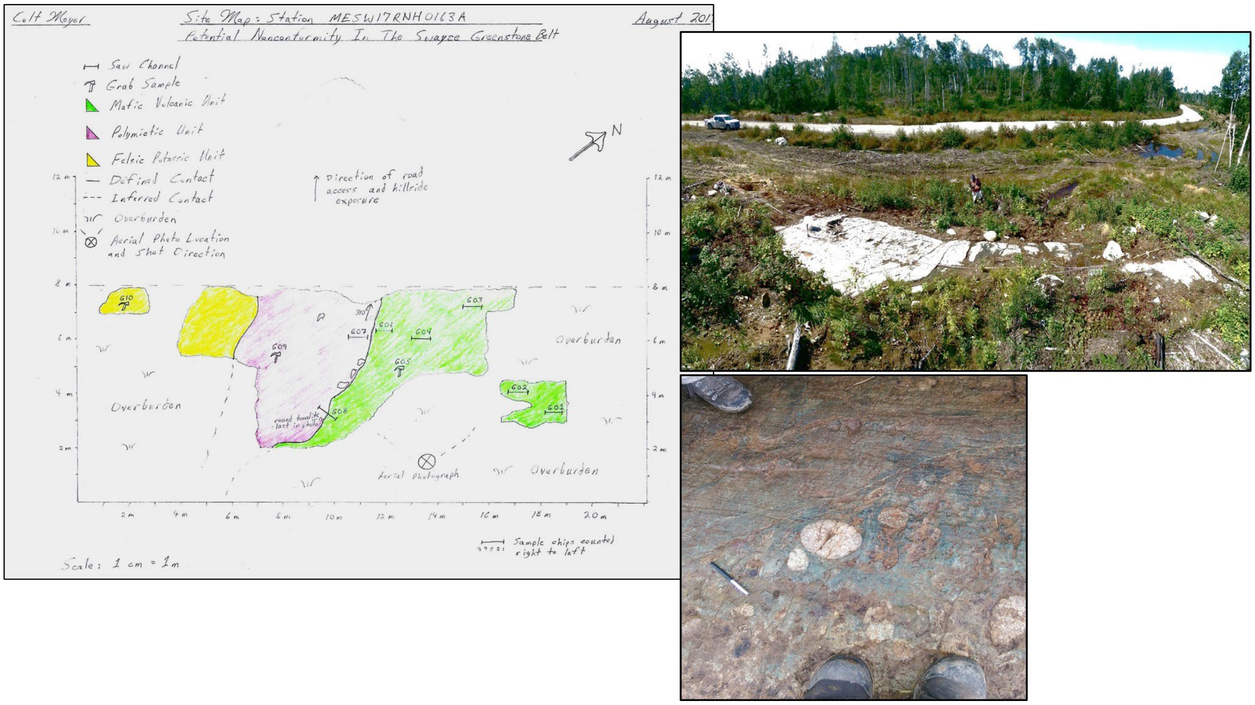

Figure 35.2. Left) Outcrop sketch. **Right**) Photos from the field, looking west from the outcrop toward the Doré Road (top) and a close-up view of the possible unconformity (bottom). Pen (13 cm) for scale.

Photo 35.1. Photos of the conglomerate as it looks 300 m west of the outcrop with the unconformity. Compass (20 cm) for scale, points north.

The contact between the conglomerate and the felsic unit at the southwest end of the outcrop is relatively straight. The felsic rock is off-white and intensely strained. The felsic unit is dominated by potassium feldspar, quartz and white to greenish mica, and it is at least 5 m thick (*see* Figure 35.2) with a strike and dip of 110/56S. The rock is likely intercalated with the conglomerate, as the latter is also exposed on the southwest side of the road, with an east-southeast strike. The protolith of this felsic rock is currently unknown.

SAMPLING

Seven channels were cut into the outcrop, from the mafic unit into the conglomerate, and numerous samples (MESW17RNH0163AG01, -G02, -G03, -G04, -G06, -G07 and -G08) were collected for later thin section and geochemical analysis. Two of the channels, both 60 cm long, were cut across the contact between the conglomerate and the mafic unit. Grab samples were also collected, for potential geochemical analysis (-G05, -G09 and -G10) and geochronology (-G10). This sampling will help with more accurately identifying the nature of the lithological contact between the conglomerate and the mafic unit.

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