

NEW GEOCHRONOLOGICAL CONSTRAINTS ON THE BULL ARM FORMATION, AVALON TERRANE, EASTERN NEWFOUNDLAND

Andrea Mills¹, Greg Dunning² and Matthew Murphy²
¹GSNL, ²Memorial University of Newfoundland

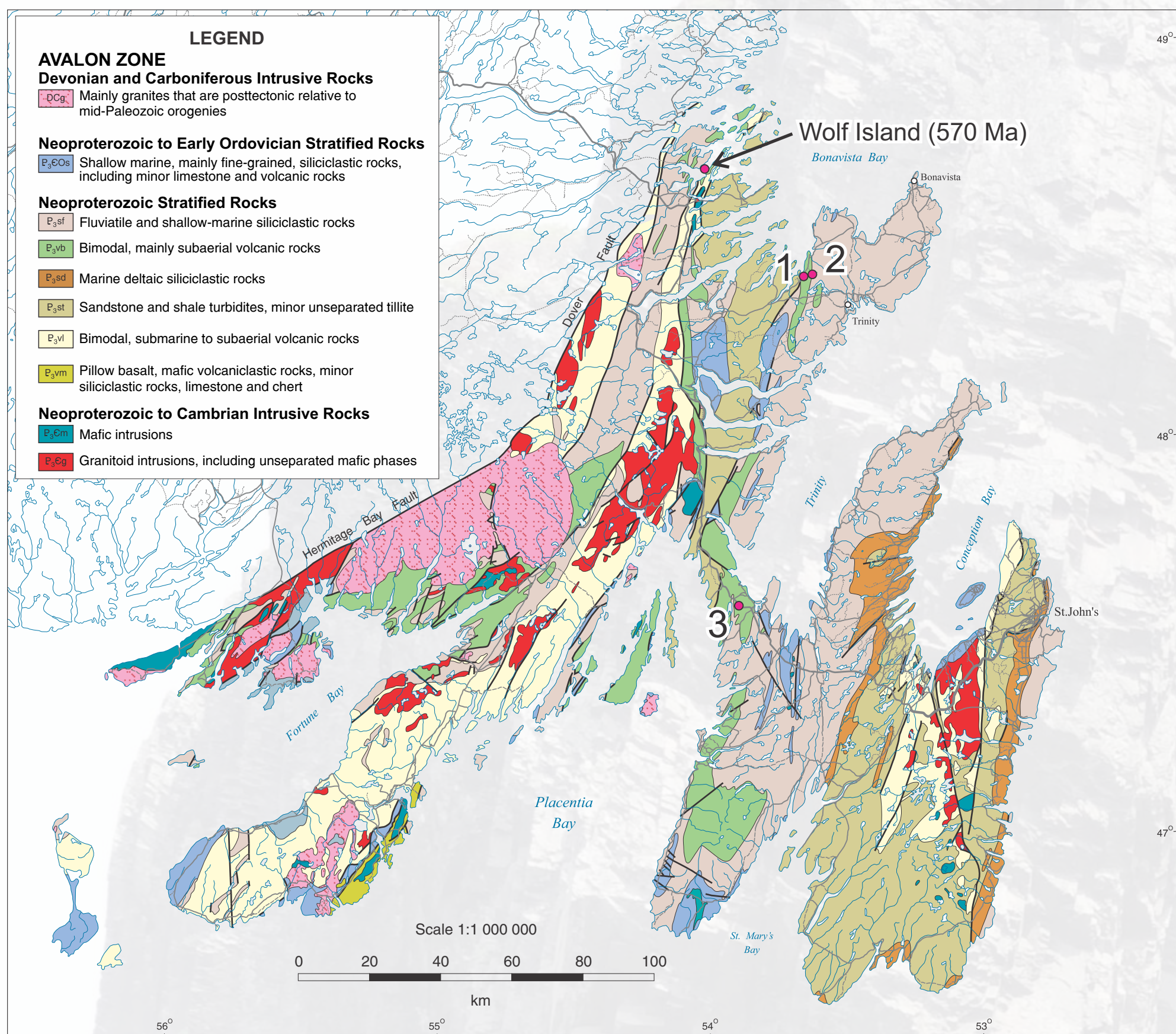


Figure 1. Regional map of the Avalon Terrane in Newfoundland showing locations of the three geochronology samples of Bull Arm Formation volcanic rocks.

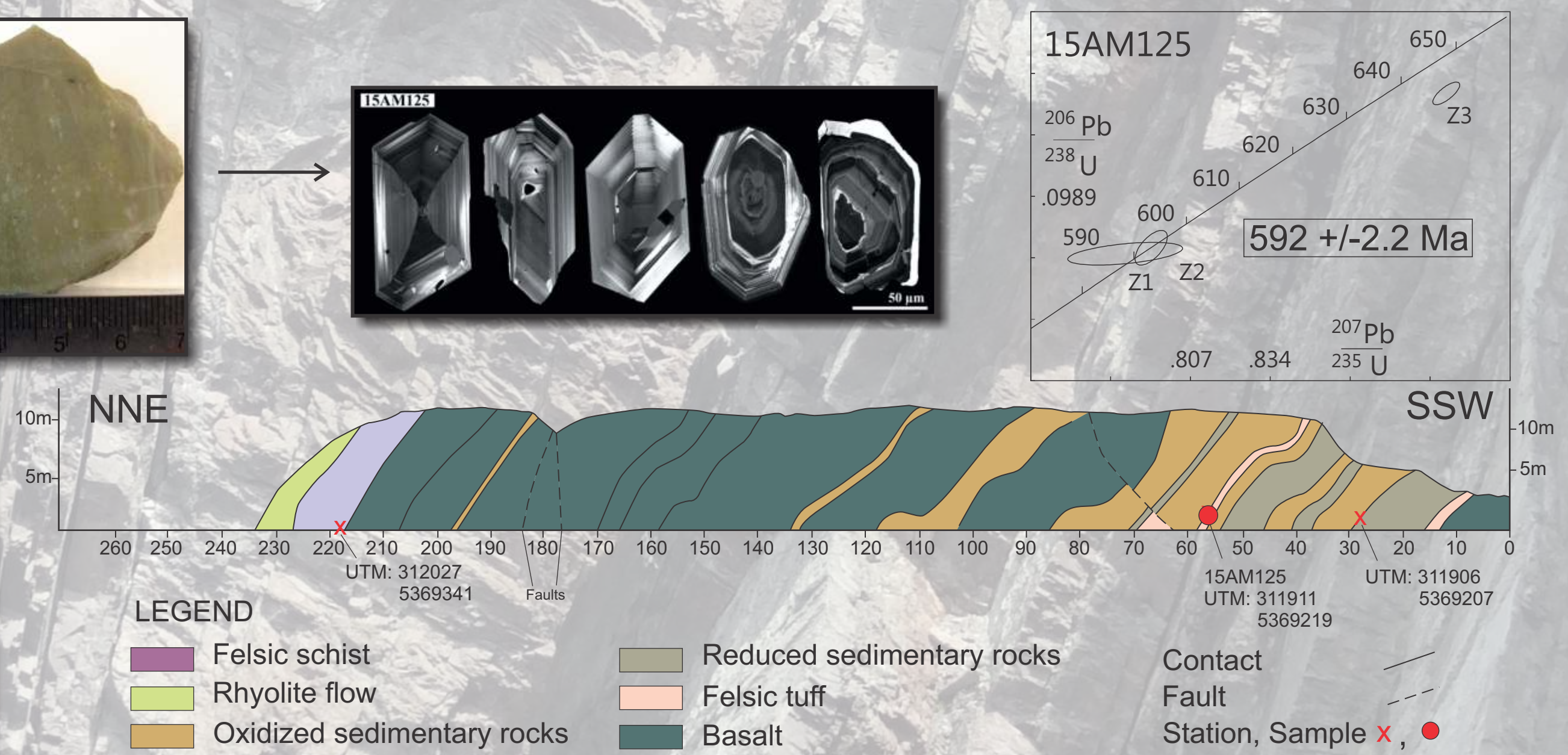
New U-Pb (CA-TIMS) geochronology results have been obtained for two rock samples from the volcanic-dominated Bull Arm Formation of the Musgravetown Group on the Bonavista Peninsula, and one sample from the isthmus that connects the Avalon Peninsula to the Island (Figure 1). A 40-cm thick crystal ash tuff near the base of the Bull Arm Formation at Summerville (1) yielded an age of 592 ± 2.2 Ma. A lapilli tuff located approximately 1800 m to the east, at the eastern margin of the volcanic package, yielded an age of 591.3 ± 1.6 Ma (2). Quartz-potassium feldspar porphyritic, banded rhyolite from the Isthmus of Avalon, approximately 95 km to the south-southwest, yielded an age of 605 ± 2 Ma (3).

The sole previous geochronological constraint for the Bull Arm Formation, $570 \pm 5/-3$ Ma, came from a rhyolite flow on Wolf Island where contact relations are not exposed to provide stratigraphic context. It was later re-interpreted as the lower part of the overlying Rocky Harbour Formation, but its initial interpretation had by then become entrenched in the literature.

The new geochronological results show that the Bull Arm Formation is older than 570 Ma, and that the volcanic rocks assigned to the Bull Arm Formation are considerably more complex than previously known. Coeval volcanism at both the western and eastern margins of the Plate Cove volcanic belt is consistent with moderate to tight, upright folding about a NNE axis, likely during Acadian deformation, as documented elsewhere on the Bonavista Peninsula.



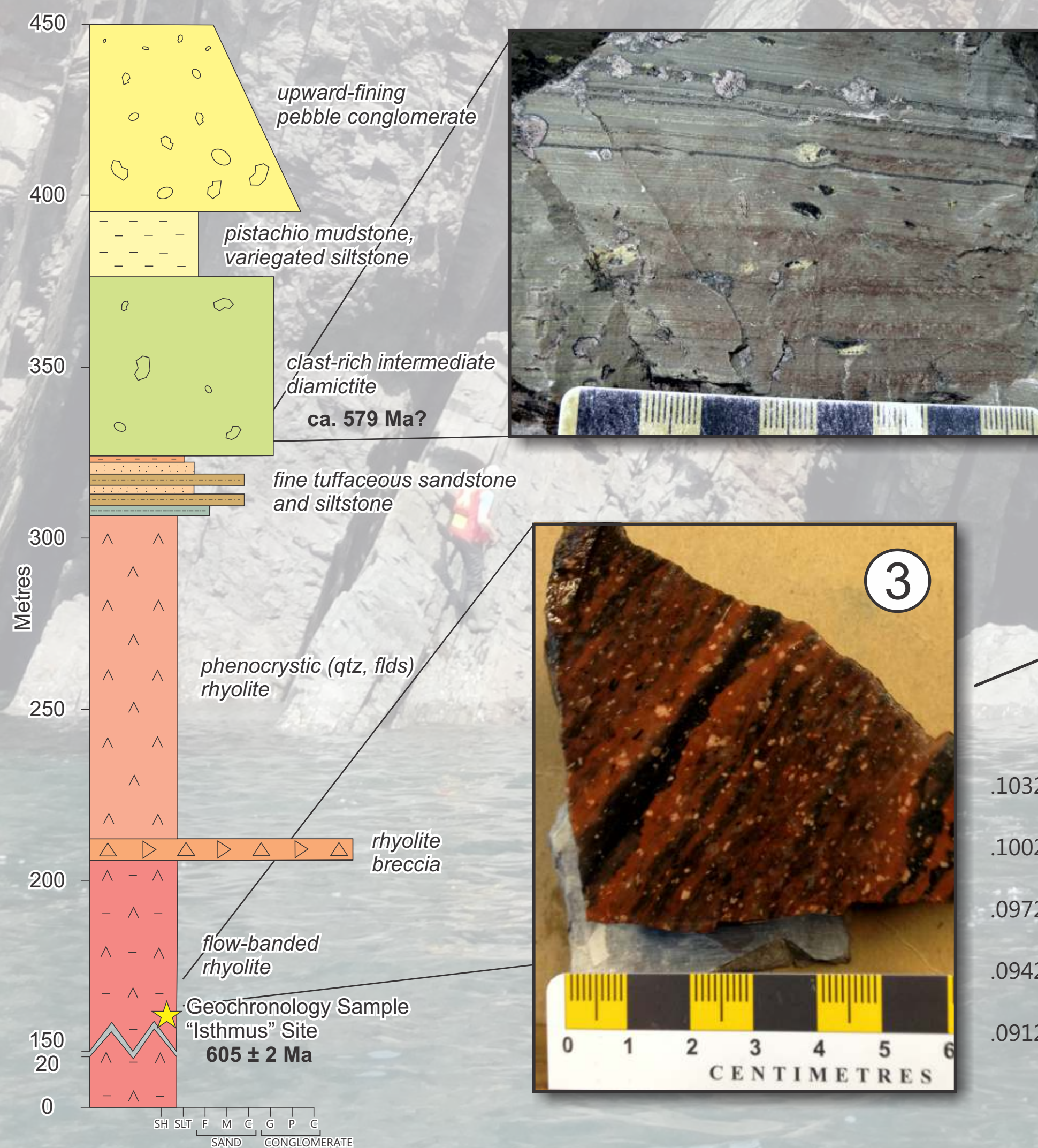
▲ Crystal ash tuff from the western margin of the Plate Cove volcanic belt yielded an age of 592 ± 2.2 Ma.



▲ Cross-section of the roadcut exposure (left) showing sample location (red dot) near the base of the exposed sequence.



▲ Lapilli tuff from the eastern margin of the Plate Cove volcanic belt yielded an age of 591.3 ± 1.6 Ma, within error of the crystal ash tuff from the western margin of the belt.



◀ Diamictite, possibly correlative to the 579 Ma Trinity facies and Gaskiers Formation, occurs ~150 m above the 605 ± 2 Ma banded rhyolite at the Isthmus of Avalon. This indicates a substantial depositional hiatus that may be related to uplift during Avalonian orogenesis.

