

**Field Trip on Aruba  
November 9, 2003**

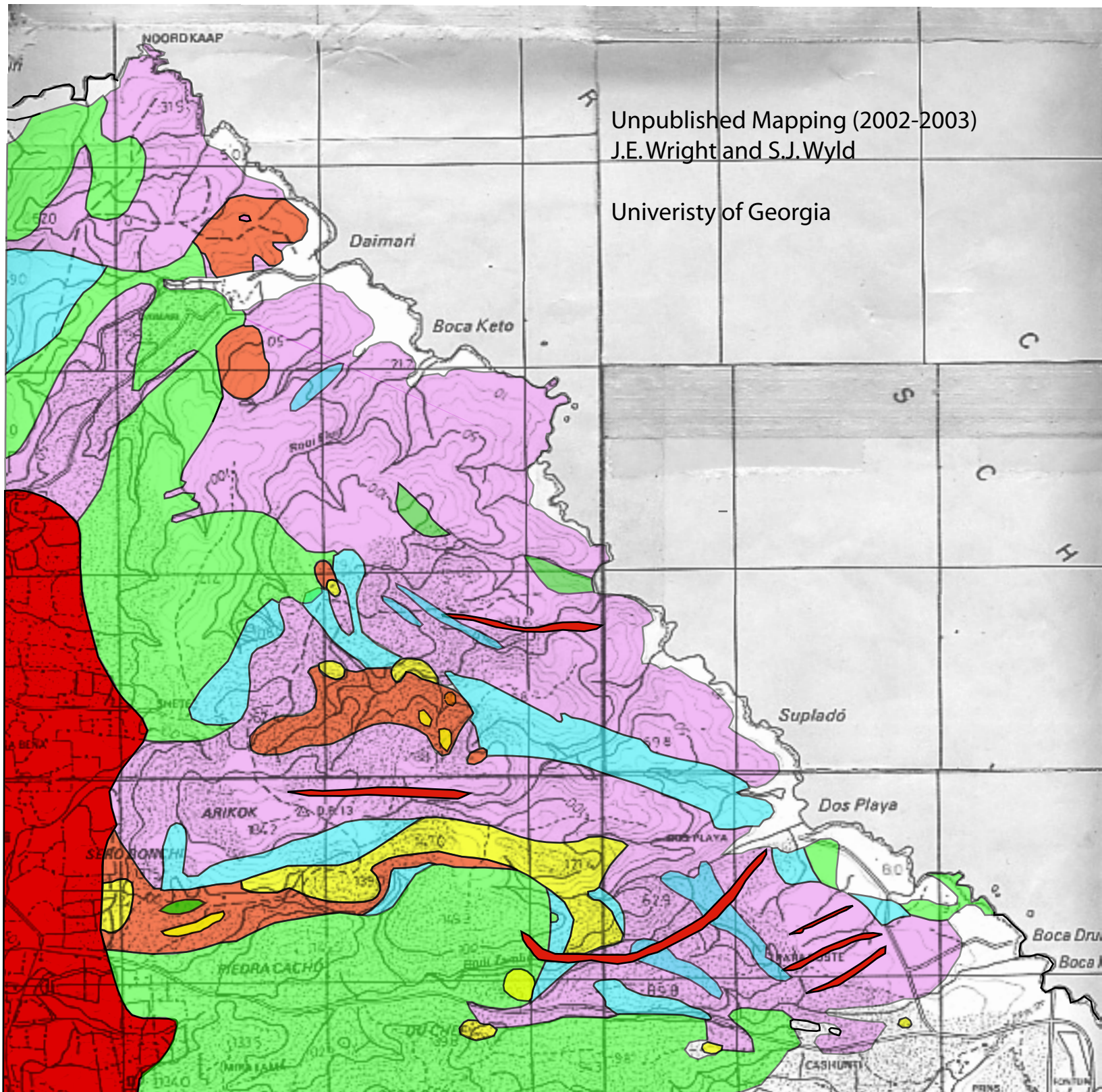
**By Jim Wright, University of Georgia**

## BRIEF GEOLOGIC HISTORY OF ARUBA

The oldest rocks exposed on Aruba are amygdaloidal basaltic pillow lavas and lesser basaltic sandstone. The pillow lavas are geochemically similar to MORB and OIT. Locally, there is a distinctive unit of pebbly mudstone, argillite and basaltic tuff interstratified with the pillow lavas. Turonian ammonites have been recovered from argillites. Both the pillow lava unit and argillaceous sediments were then intruded by a diabase complex. The intrusive rocks are geochemically indistinguishable from the pillow lavas. White and others (1999) interpret the lavas and diabase as having been formed in an ocean plateau.

Following emplacement of the diabase unit, Aruba became emergent. There is abundant evidence for weathering and erosion of the pillow lavas and diabase unit. Basaltic magmatism continued as witnessed by the accumulation of accretionary lapilli tuff. This type of deposit only forms in a subaerial environment. The accretionary lapilli tuff was shortly thereafter reworked by local stream(s) which produced a coarse conglomerate composed entirely of clasts of basalt, diabase and lesser amounts of accretionary lapilli. The accretionary lapilli and conglomerate units are almost always found together and are interpreted to have been deposited in a paleo valley.

Following this, the entire sequence underwent low grade regional metamorphism accompanied by folding and cleavage formation. This event is constrained to be Turonian ( $93.5 \pm 4$  Ma--- $89 \pm 1$  Ma) but pre emplacement of the Aruba batholith at  $89 \pm 1$  ma (SHRIMP U-Pb, zircon date). Thus, this area went from being emergent to undergoing regional metamorphism and batholith emplacement in a very short period of time. We will examine all the relations discussed above and discuss the probably tectonic setting of the deformational and metamorphic event, and implications for the origin of the Caribbean plate.



Unpublished Mapping (2002-2003)

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$89 \pm 1\text{Ma}$



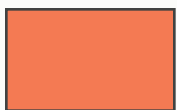
Aruba Batholith (Quartz Diorite)



Deformation and  
Metamorphism



Conglomerate (derived from erosion of older units)



Basaltic Accretionary Lapilli tuff



Unconformity

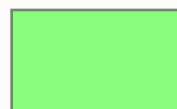


Diabase

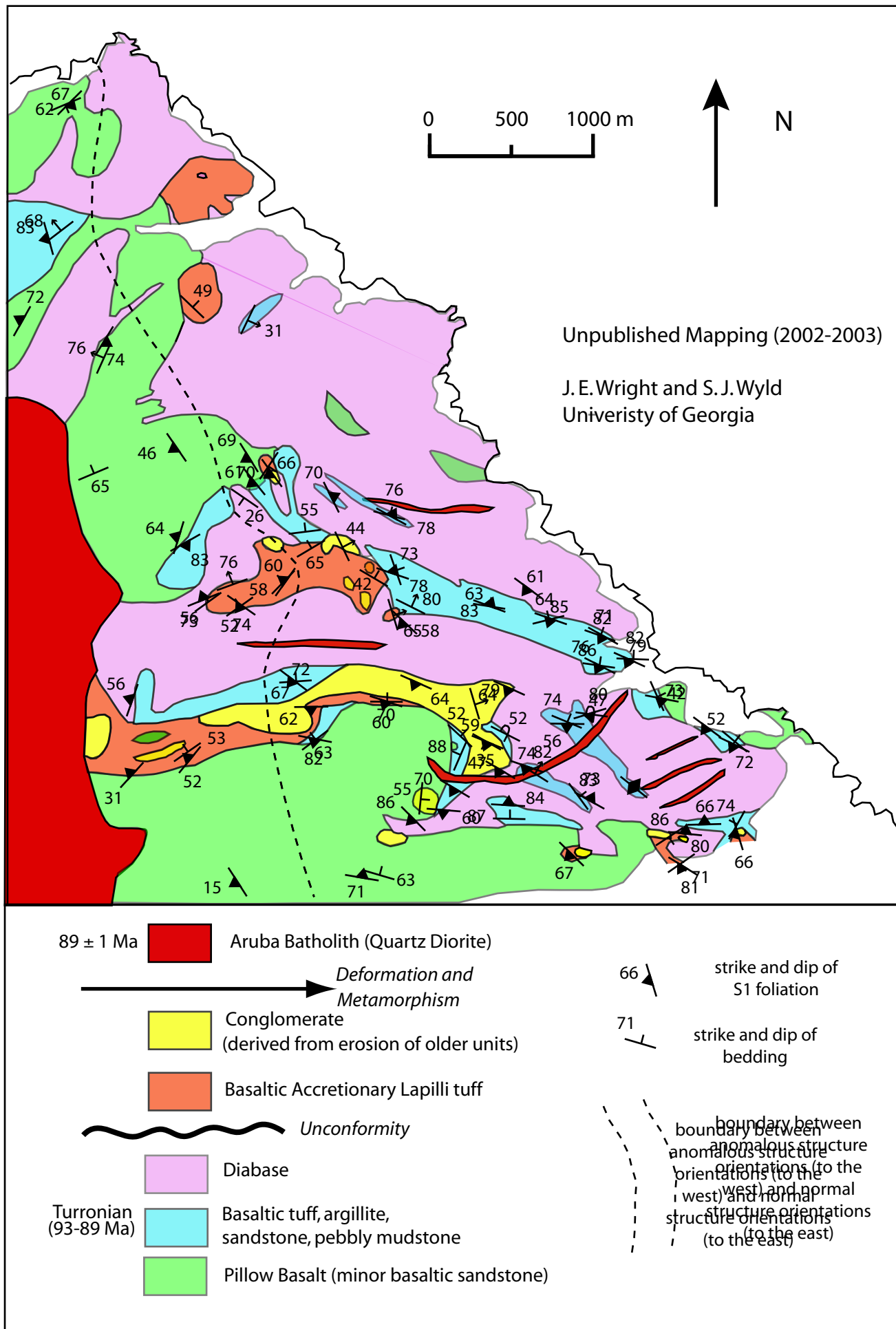
Turonian  
(93-89 Ma)



Basaltic tuff, argillite, sandstone, pebbly mudstone

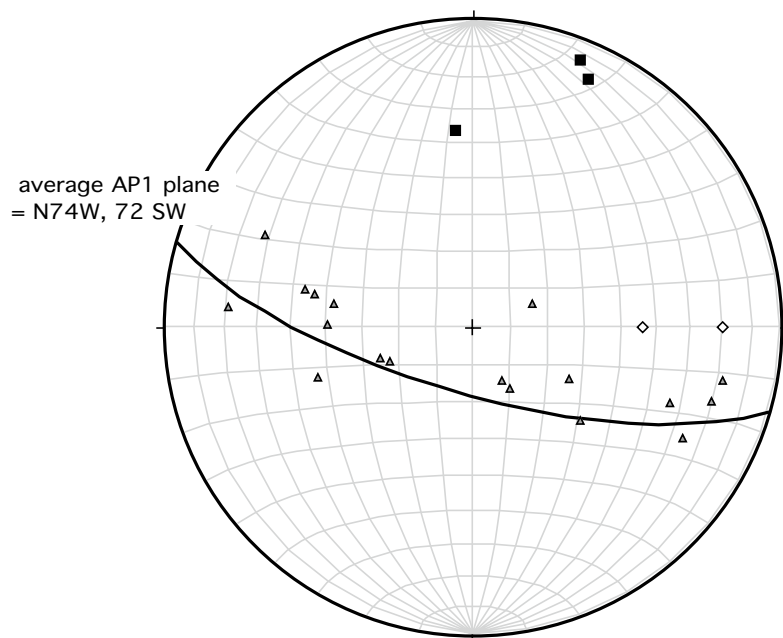
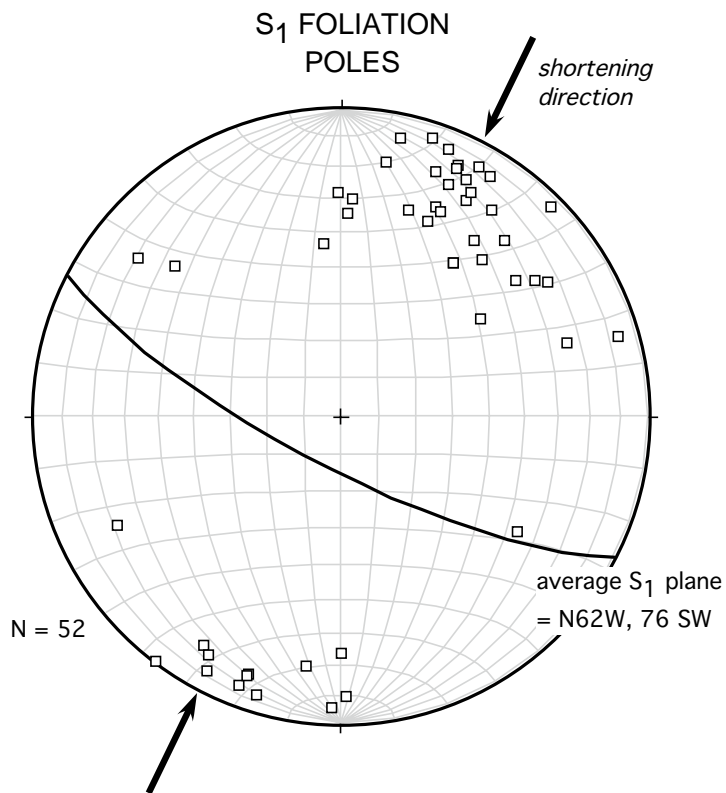
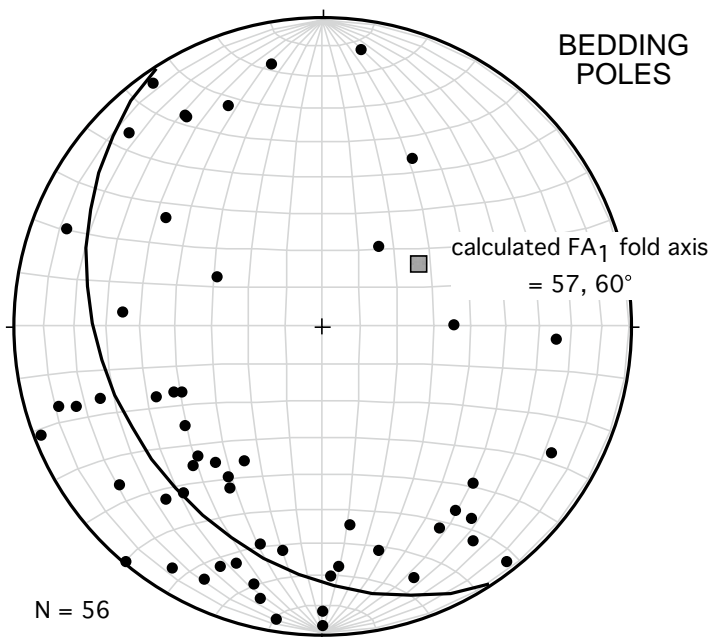


Pillow Basalt (Minor basaltic sandstone)



# ARUBA STRUCTURAL DATA (2002, 2003)

Unpublished data  
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F<sub>1</sub> axial plane poles  
N = 3 ; Symbol = ■

F<sub>1</sub> fold axis  
N = 2 ; Symbol = ◇

L<sub>0x1</sub> (intersection lineation between S<sub>0</sub>  
and S<sub>1</sub>) (= proxy for FA1)  
N = 18 ; Symbol = ▲

*scatter in FA1 and L0x1 indicates non-cylindrical folding*



Cretaceous weathering on Aruba.



Example of modern weathering to compare with Cretaceous weathering.

Timescale used is from the Geological Society of America (1999, Compiled by A.R. Palmer and J. Geissman).