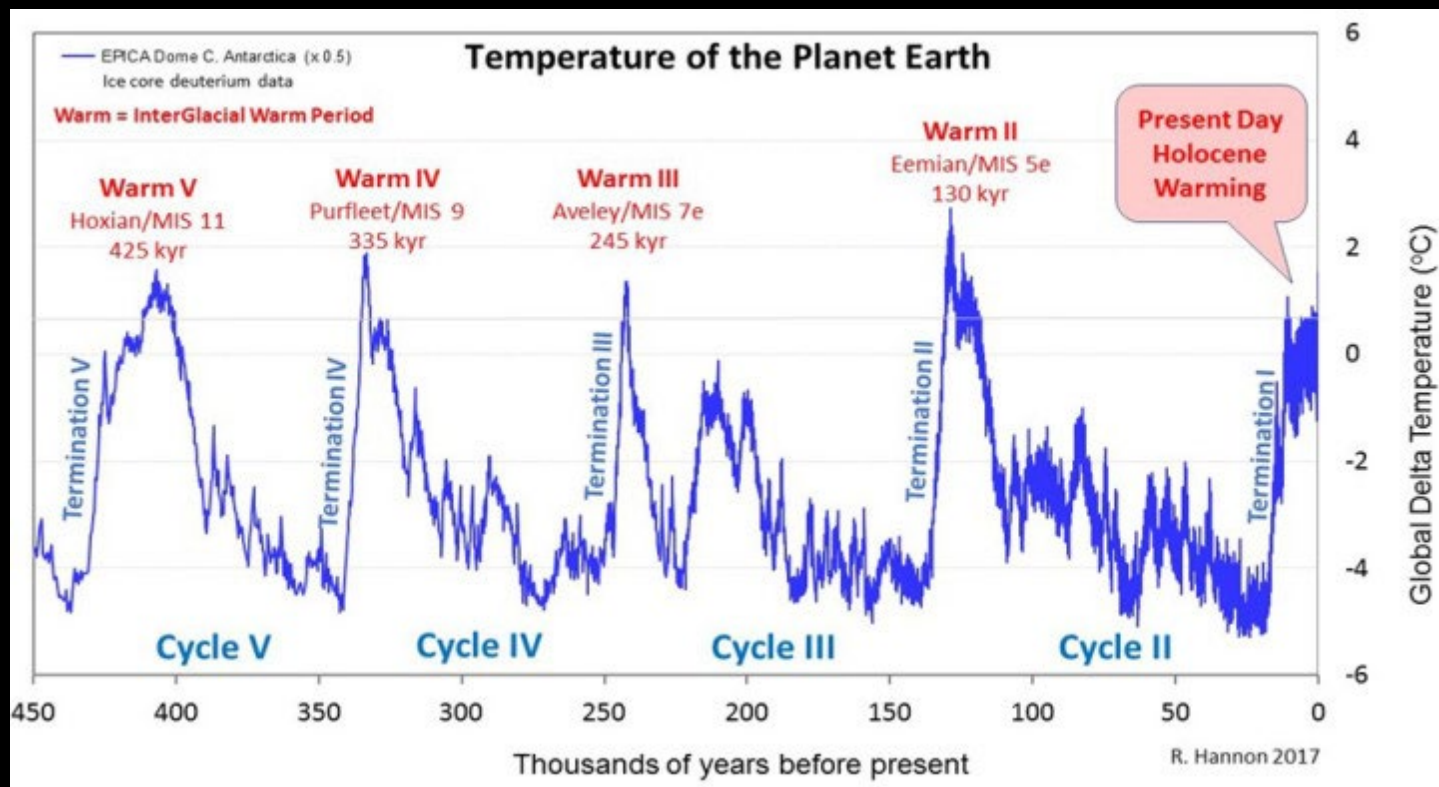
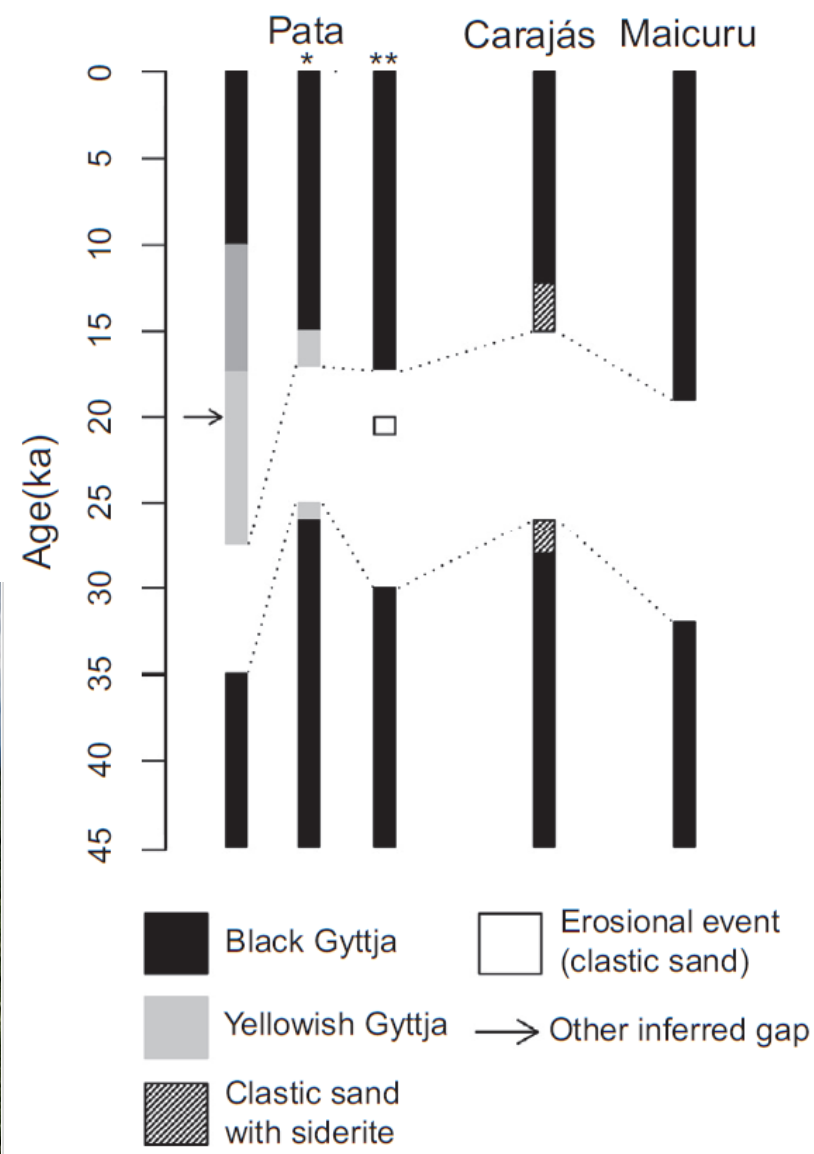
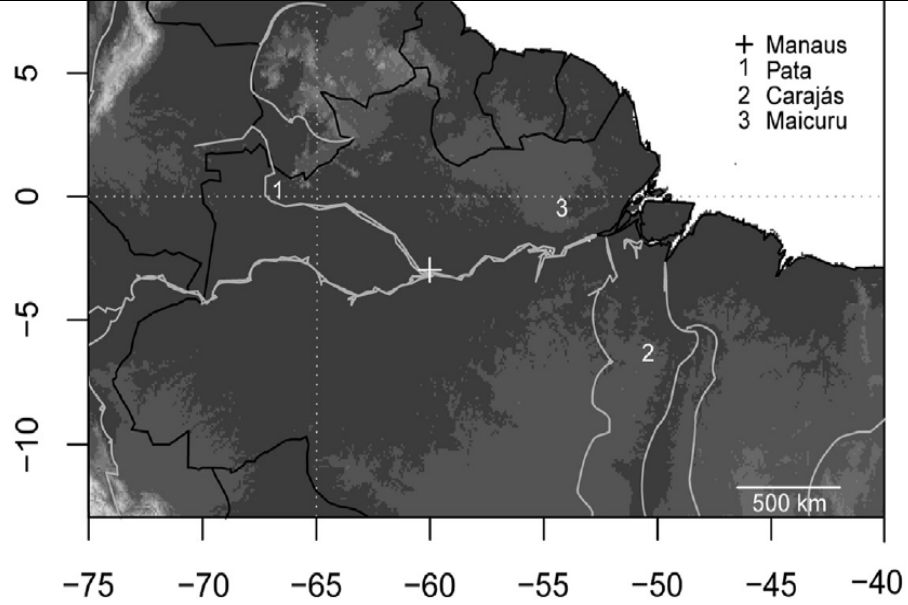


# Quaternary climate change and its importance for gold exploration in the Guiana Shield

Salomon B. Kroonenberg, Kathleen Gersie

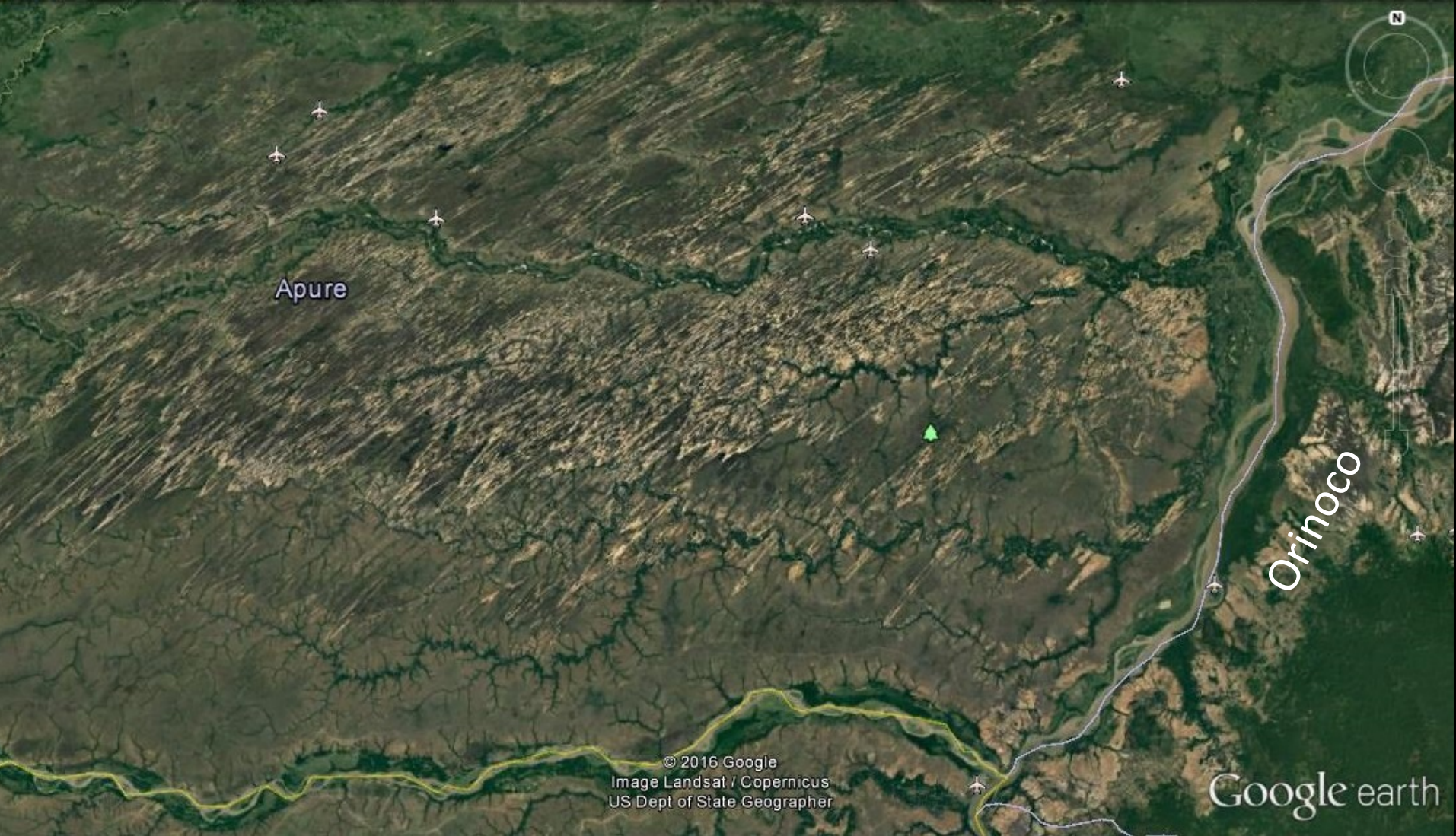




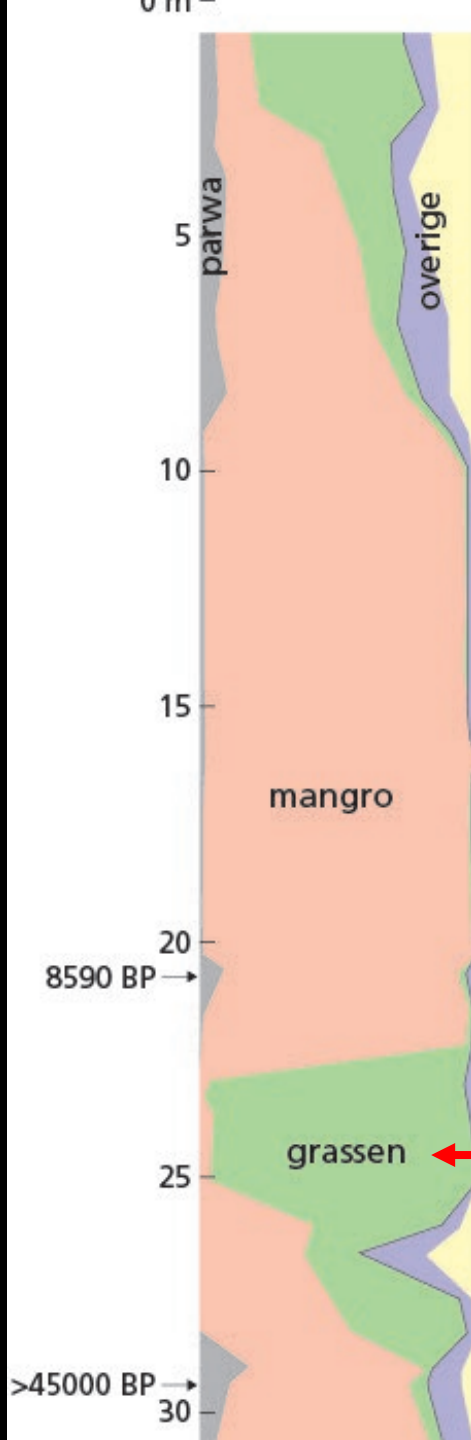
Ice age aridity according to pollen studies

D'Apolito et al., 2013

Carbonatito Seis Lagos



Ice-age hairpin dunes (médanos) SW Venezuela, E. Colombia



Pollen data from coastal Ogle Bridge site, Guyana indicate ice age aridity (Van der Hammen, 1963)

Ice age grass savannah vegetation



Hard rock and regolith, Bakhuis Mts



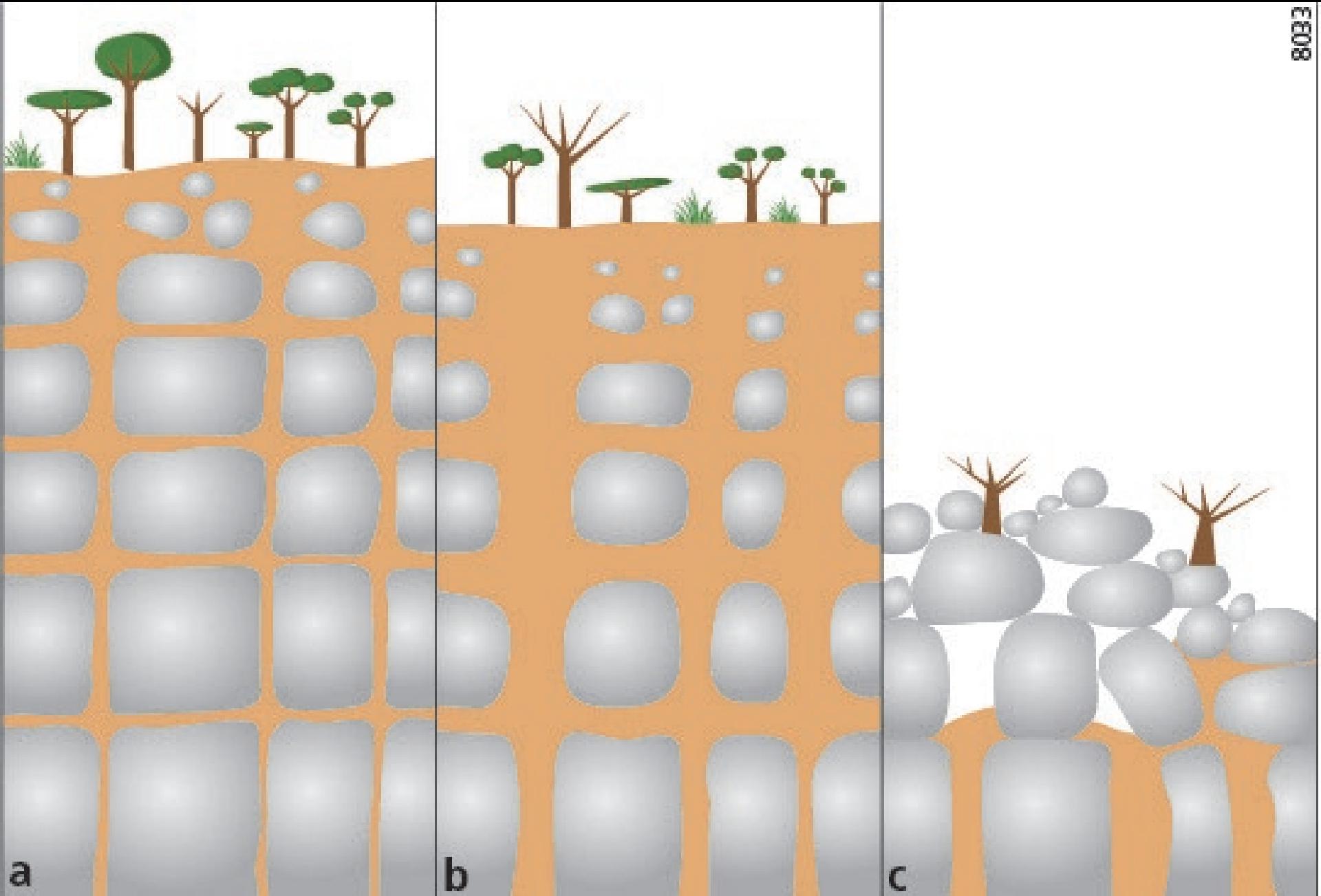
**Saprolite: retains rock structure**



Colluvial material, Peto Creek, Saramacca





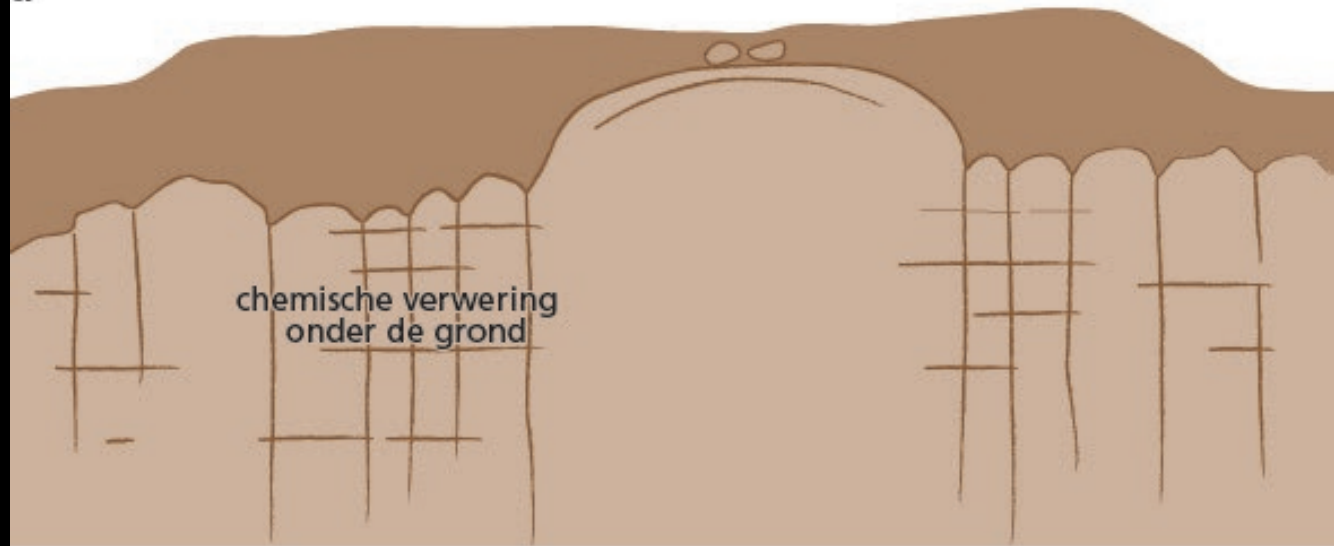


Tor formation by stripping regolith



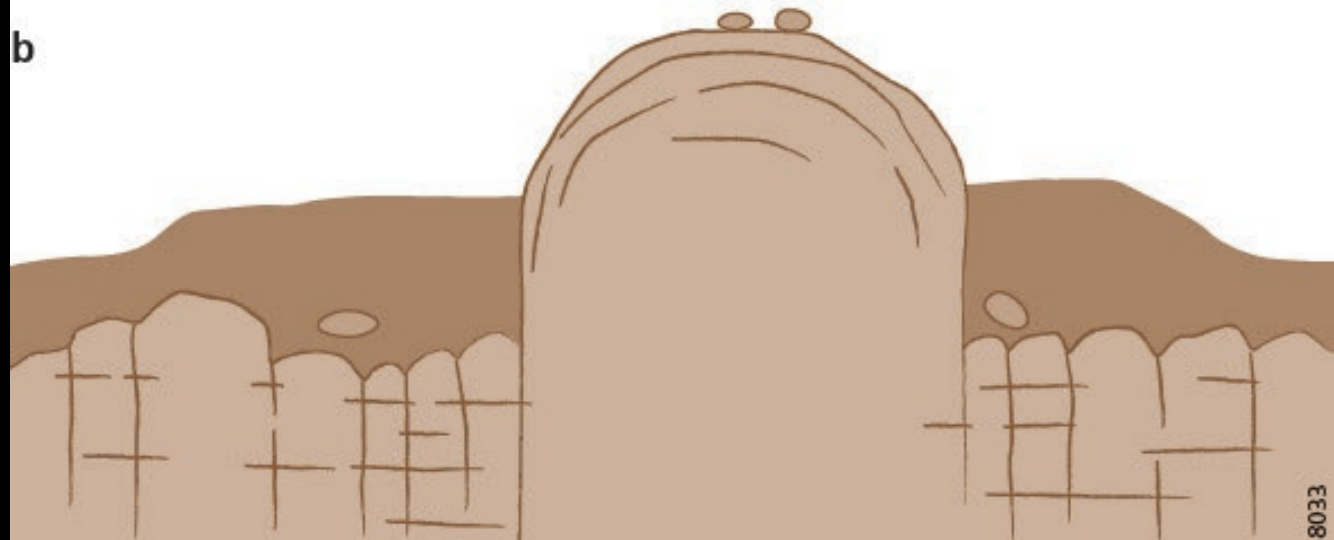
Inselberg, Devil's Egg, Wilhelmina Mountains

a



Erosie brengt inselberg aan het oppervlak,  
daarbuiten gaat ondergrondse vertering door

b





Bauxite cap, Bakhuis Mountains



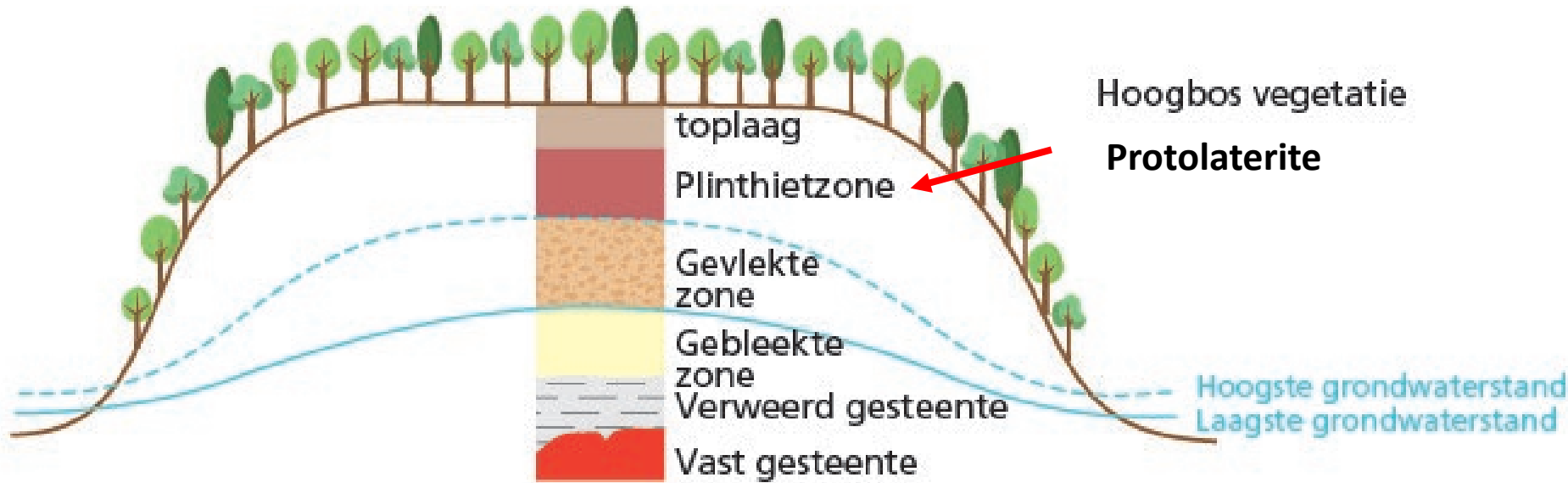
Laterite cap

Mottled zone

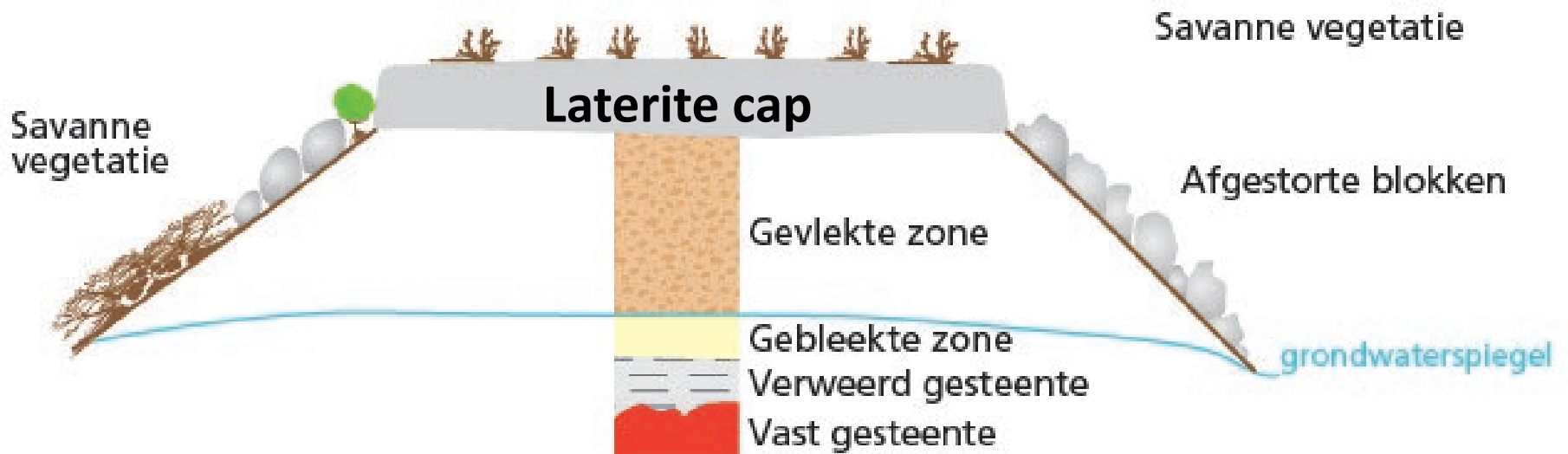
Pallid zone

Classic laterite profile on  
Avanavero Dolerite,  
Avanavero, Suriname

# 1. Afwisselend droog-nat klimaat




# 2. Semi-aride klimaat





Normal  
flat-bottomed creek



Former flat swampy creek bottom  
downstream from laterite cap Nassau Mts  
converted in boulder stream by gold miners  
Points to more arid flow regime in ice age





Diamant Nassagebergte





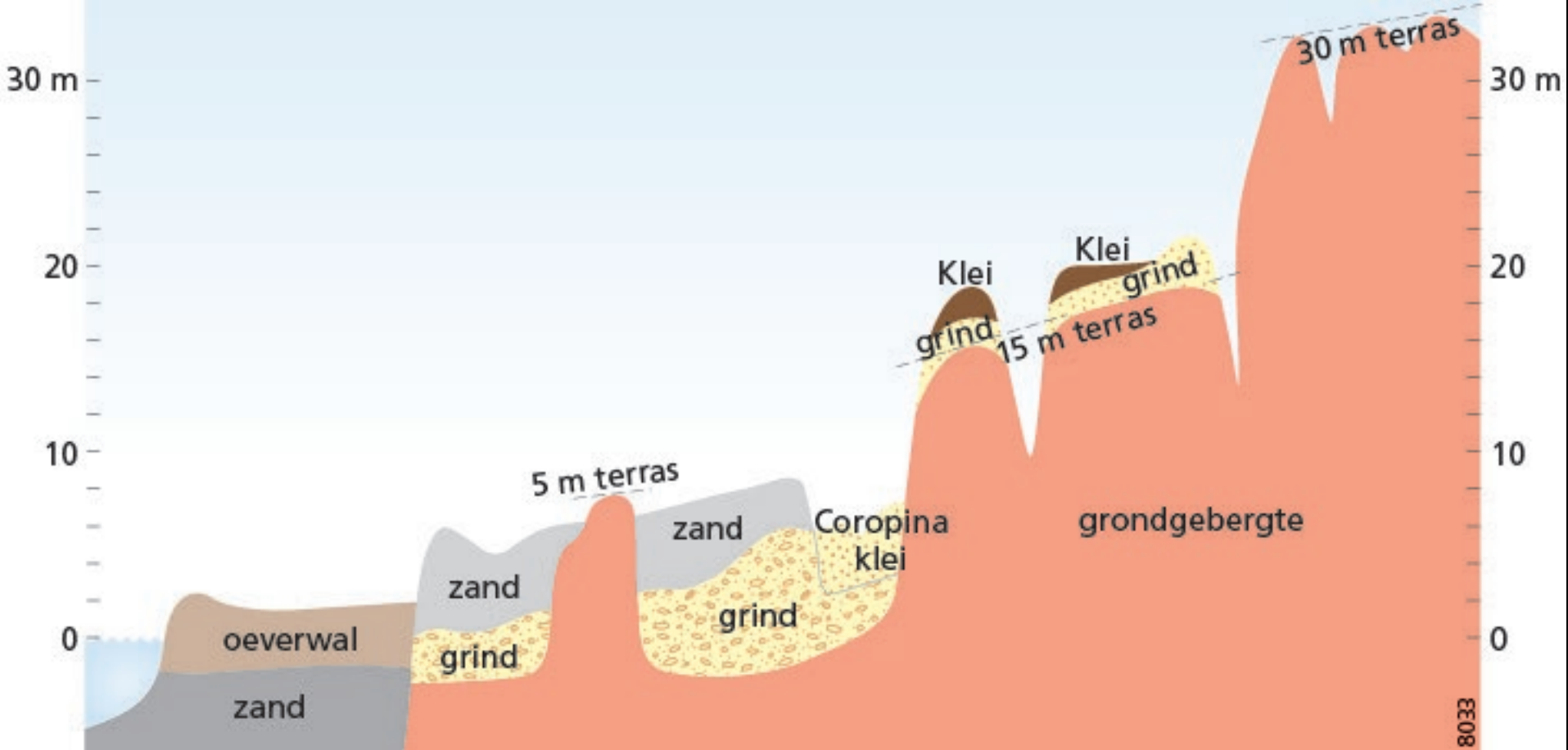
Further downstream  
grain size diminishes



Gold-bearing river terrace quartz gravel, Marowijne River, Suriname,



No gravel to erode the cataracts



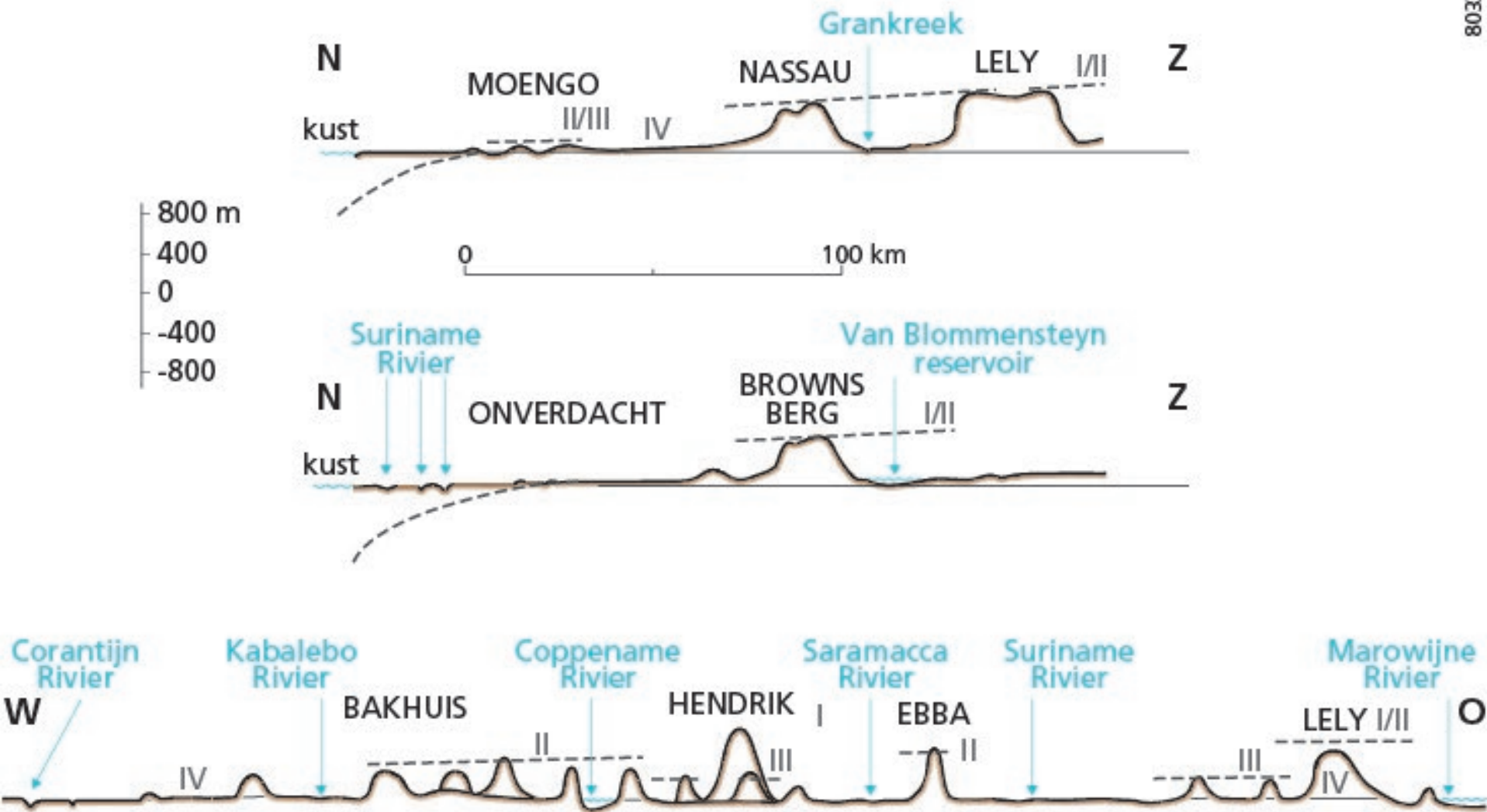
## Marowijne River terraces:

(Semi-)arid climate, braided river systems, accumulation gravel terraces

Present humid climate:, no gravel formation, dissection, cataracts

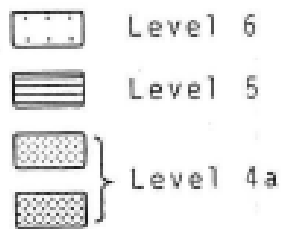
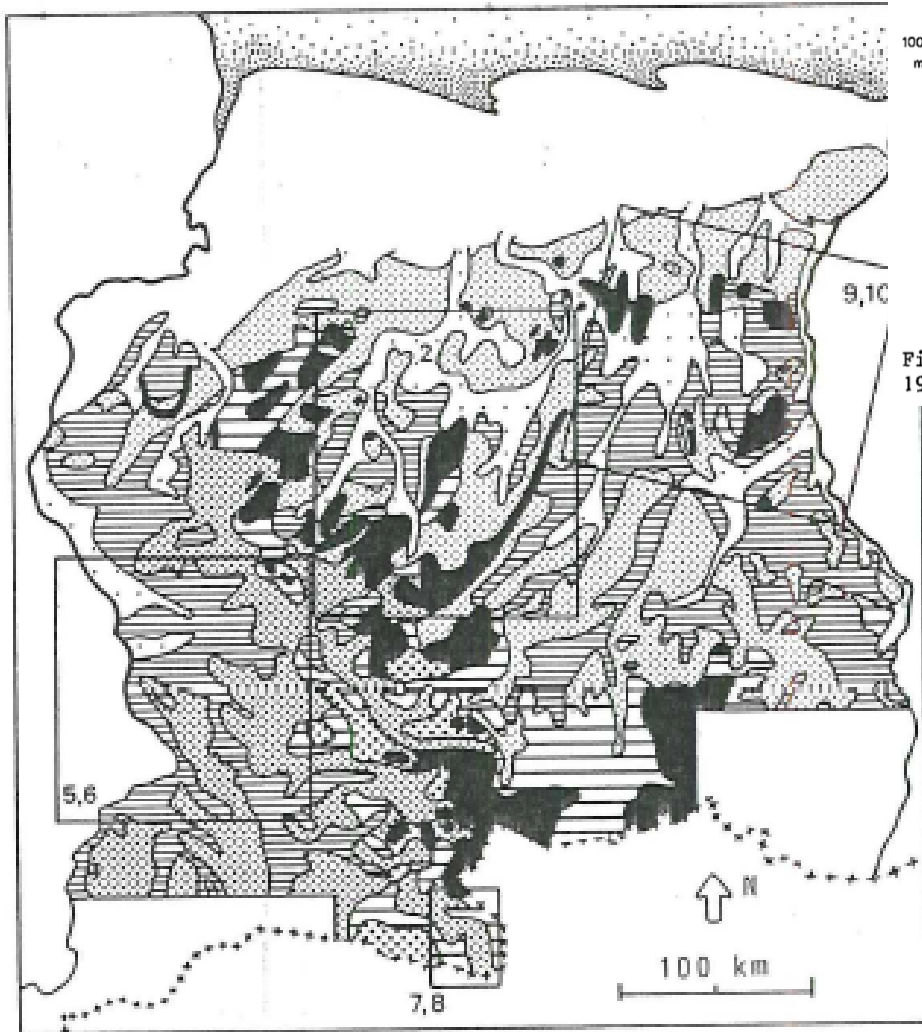


Gold dredge, Saramacca, reworks gravel from river bottom



Planation surfaces reconstructed by connecting laterite caps





Zonneveld, 1993

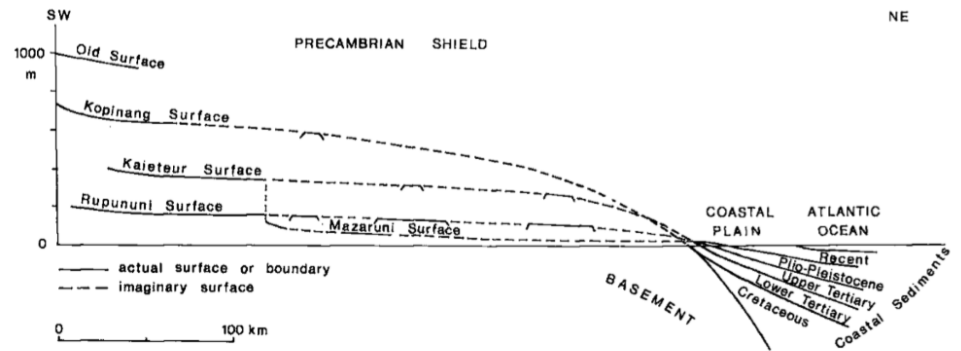
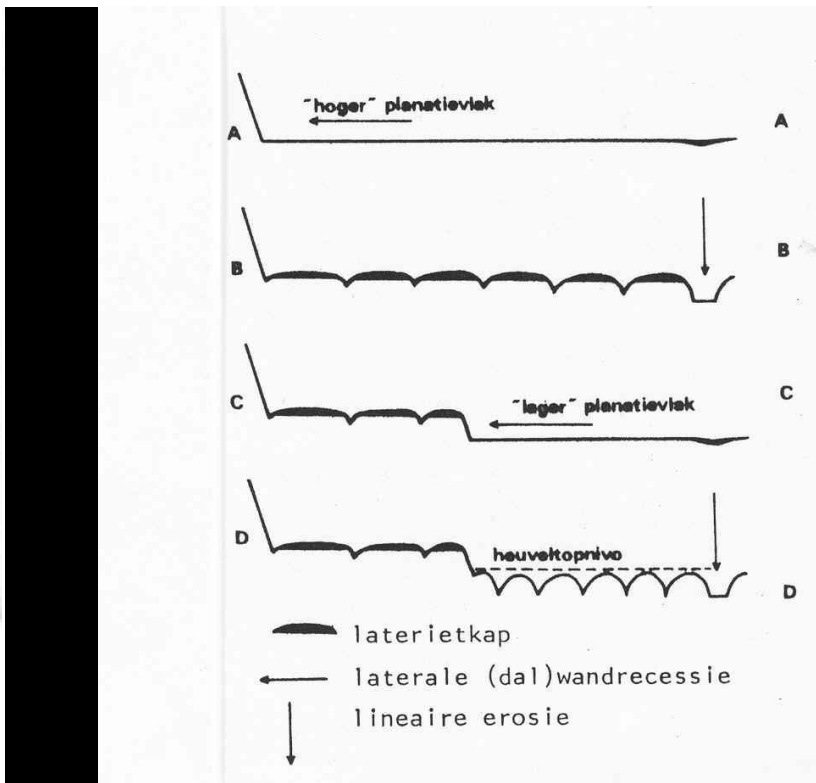
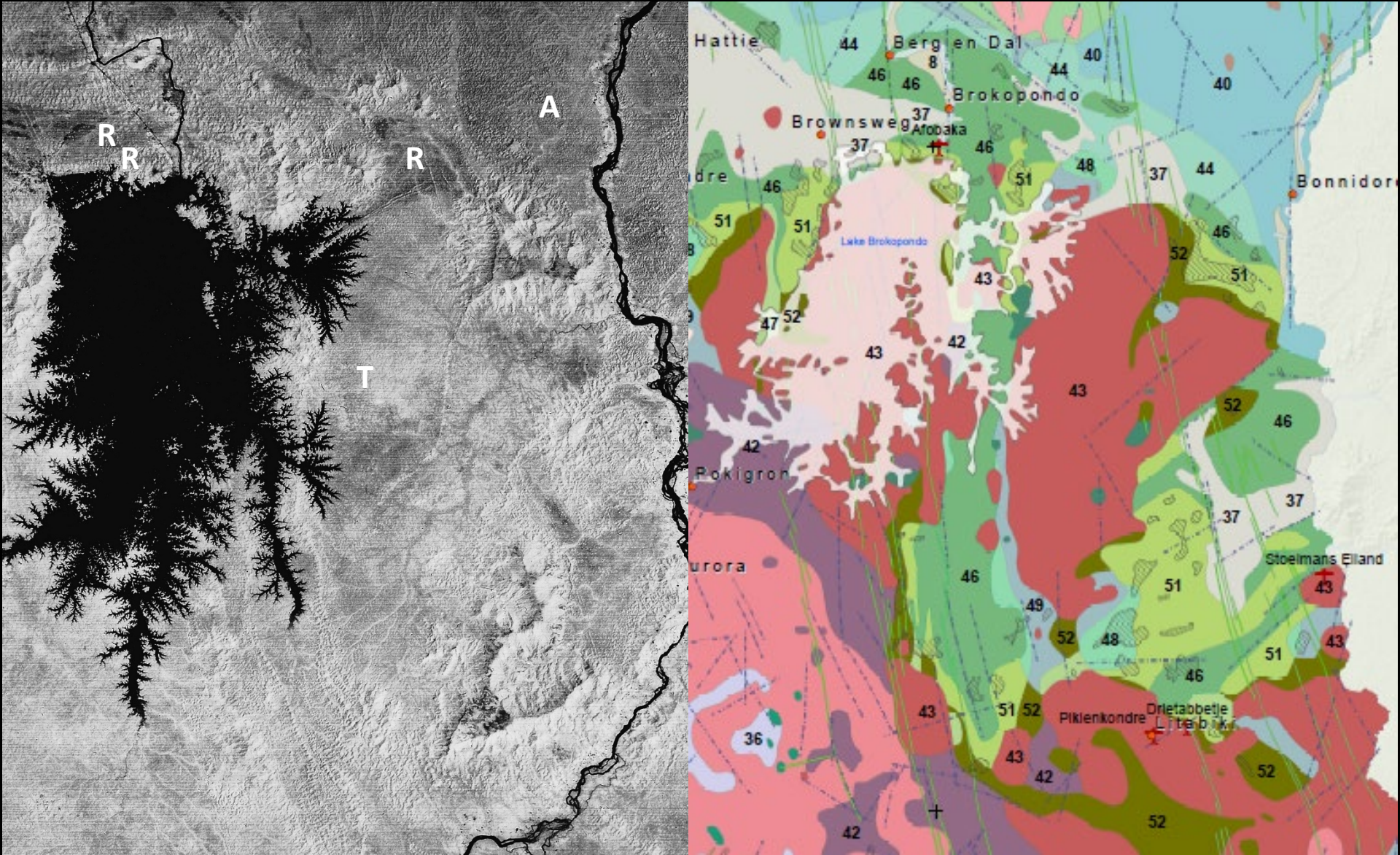


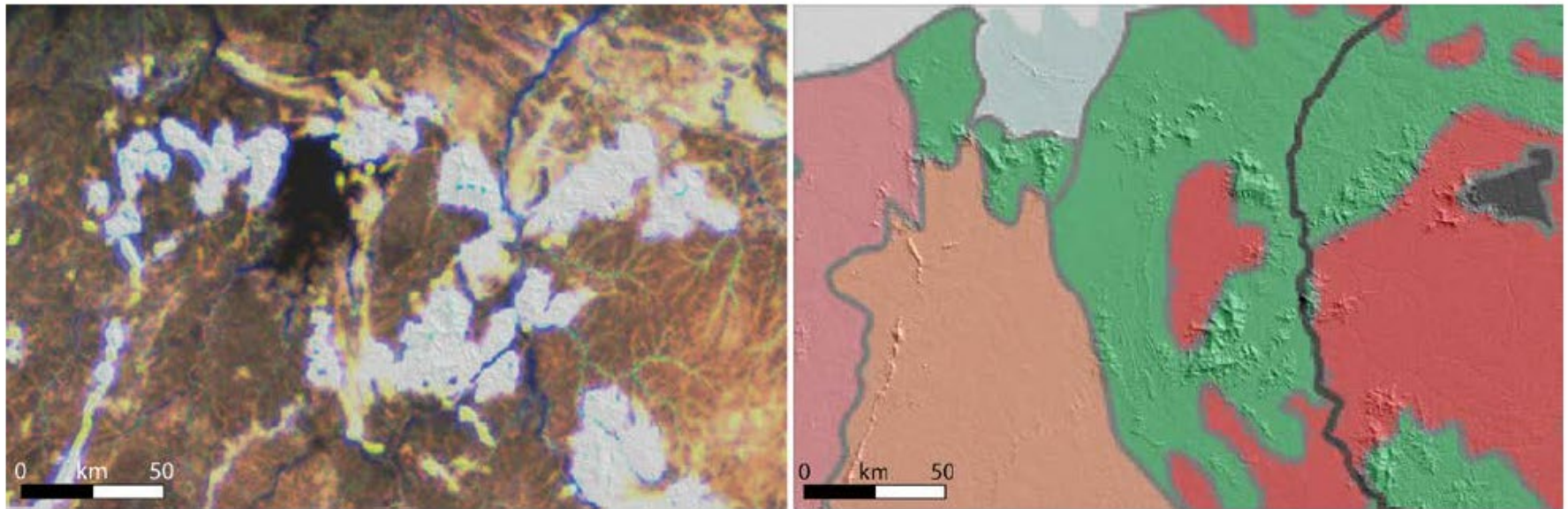
Fig. 11. Provisional diagram of planation surfaces in Guyana (from Mc Connell, 1966, slightly modified).



Planation levels by backwearing?  
Doesn't work in crystalline  
basement rocks

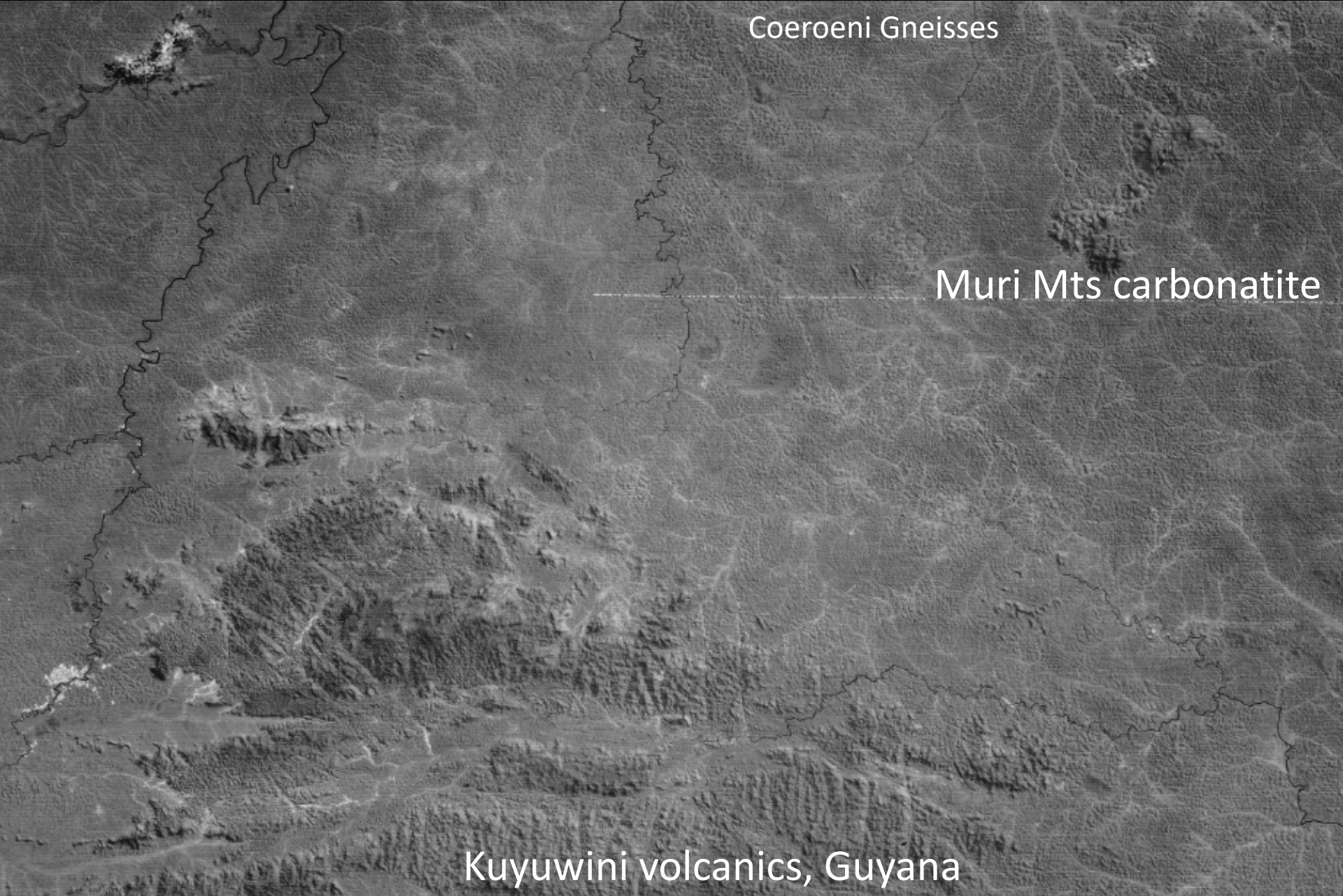


Relief and elevation follow lithological boundaries



**Figure 4 – Illustration of the association of roughness units (left) with geological units (right, see Fig. 1 for legend and location of the close-up view). For the roughness map, the R, G and B channels correspond to roughness values calculated with baselines of 990m, 2790m and 8190m, respectively.**

David Baratoux Roughness map of the same area  
(this conference)

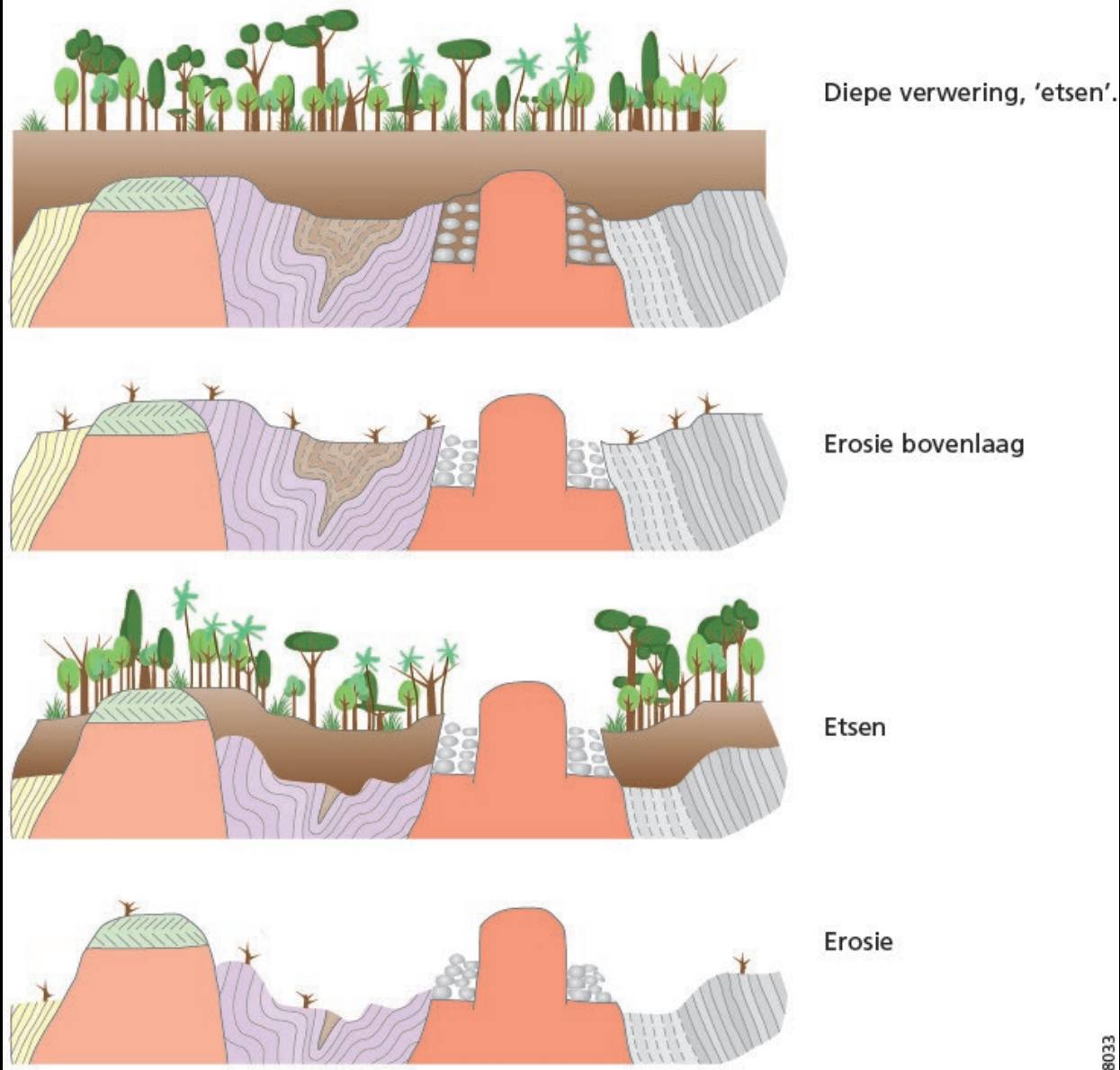


Coeroeni Gneisses

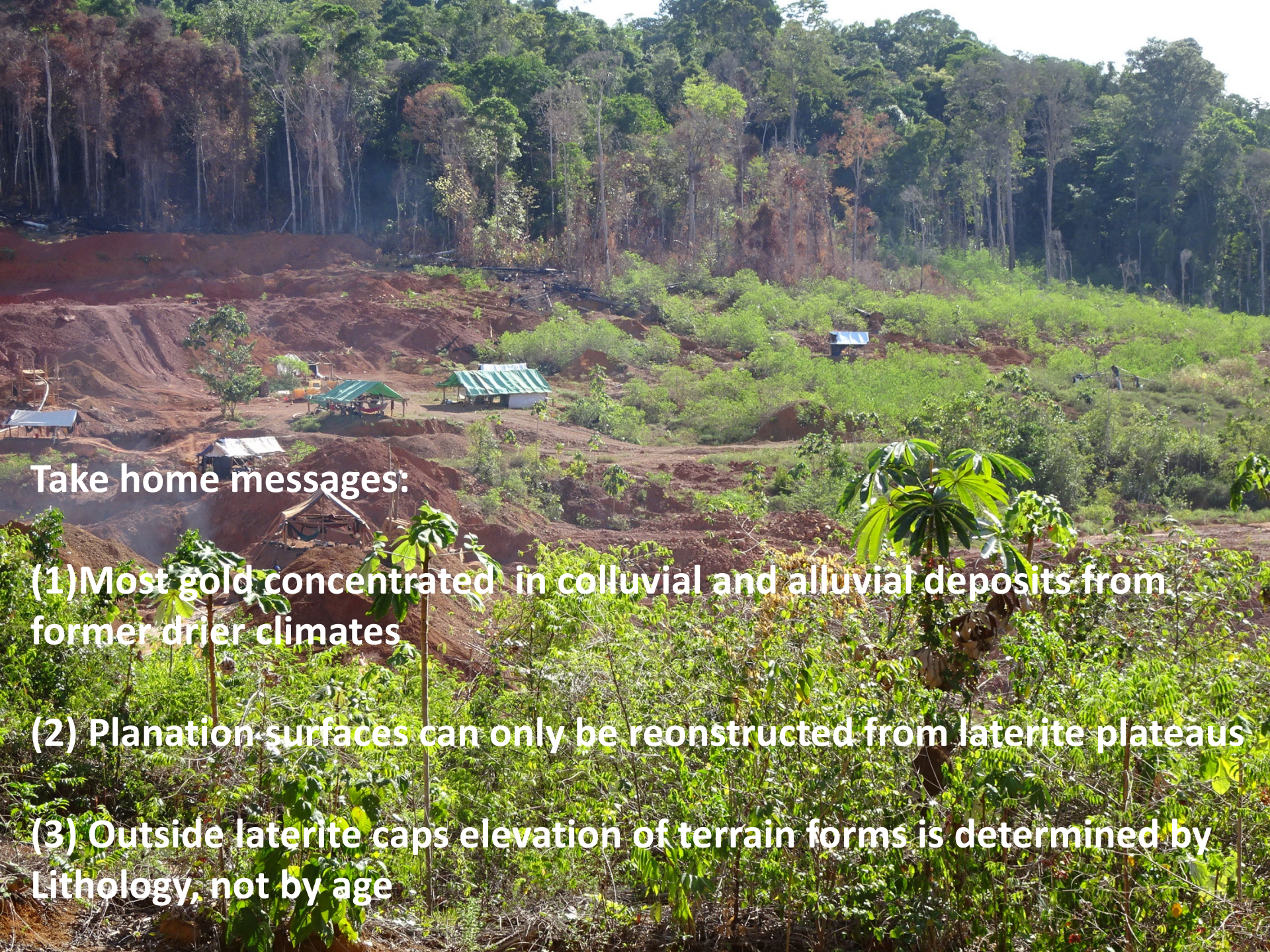
Muri Mts carbonatite

Kuyuwini volcanics, Guyana

Landforms follow lithology, not planation levels



The etchplain concept:  
 elevation is a function of lithology, not of age



**Take home messages:**

- (1) Most gold concentrated in colluvial and alluvial deposits from former drier climates**
- (2) Planation surfaces can only be reconstructed from laterite plateaus**
- (3) Outside laterite caps elevation of terrain forms is determined by Lithology, not by age**