

# **Geochemical origin of sodic soil along the Phugwane**

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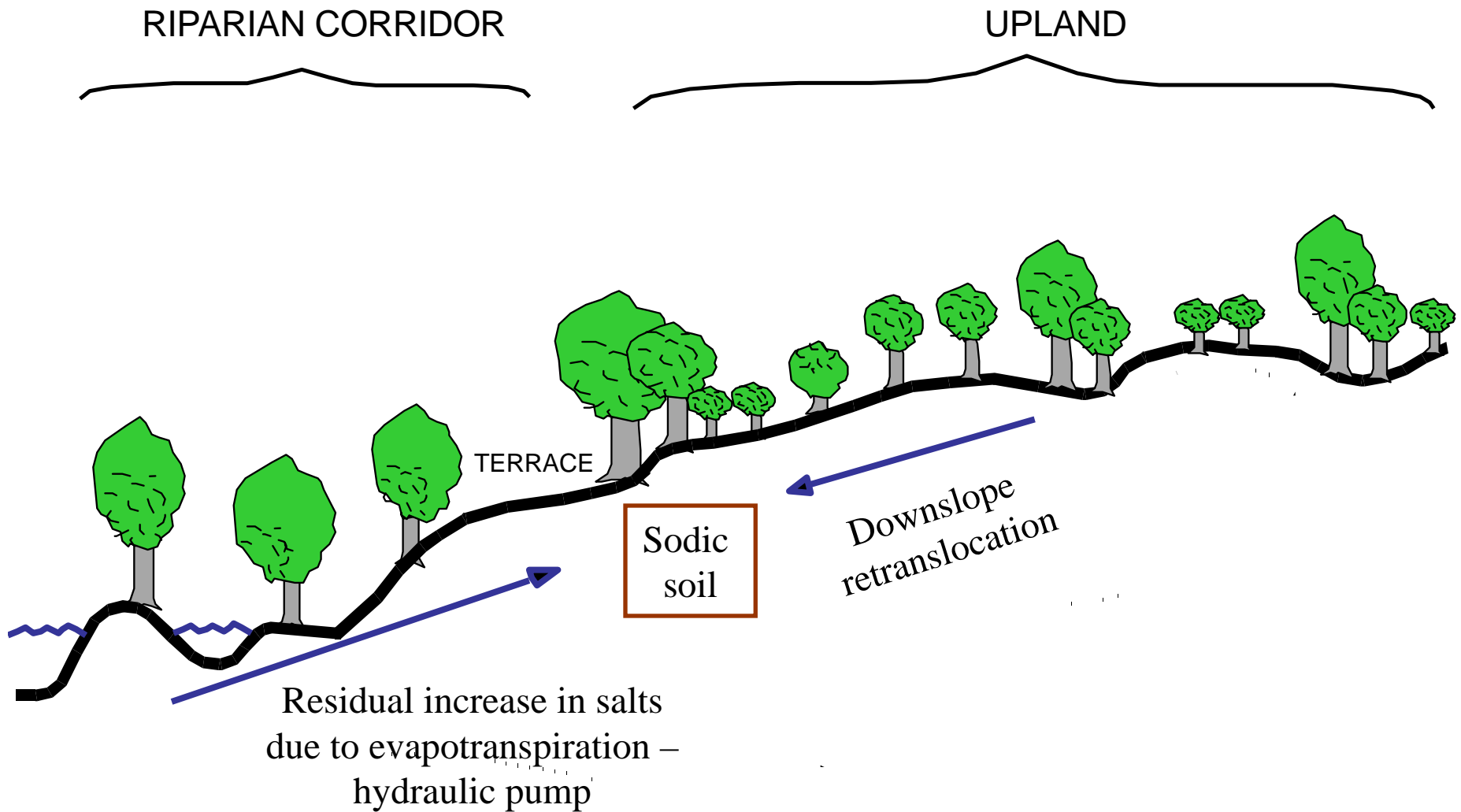
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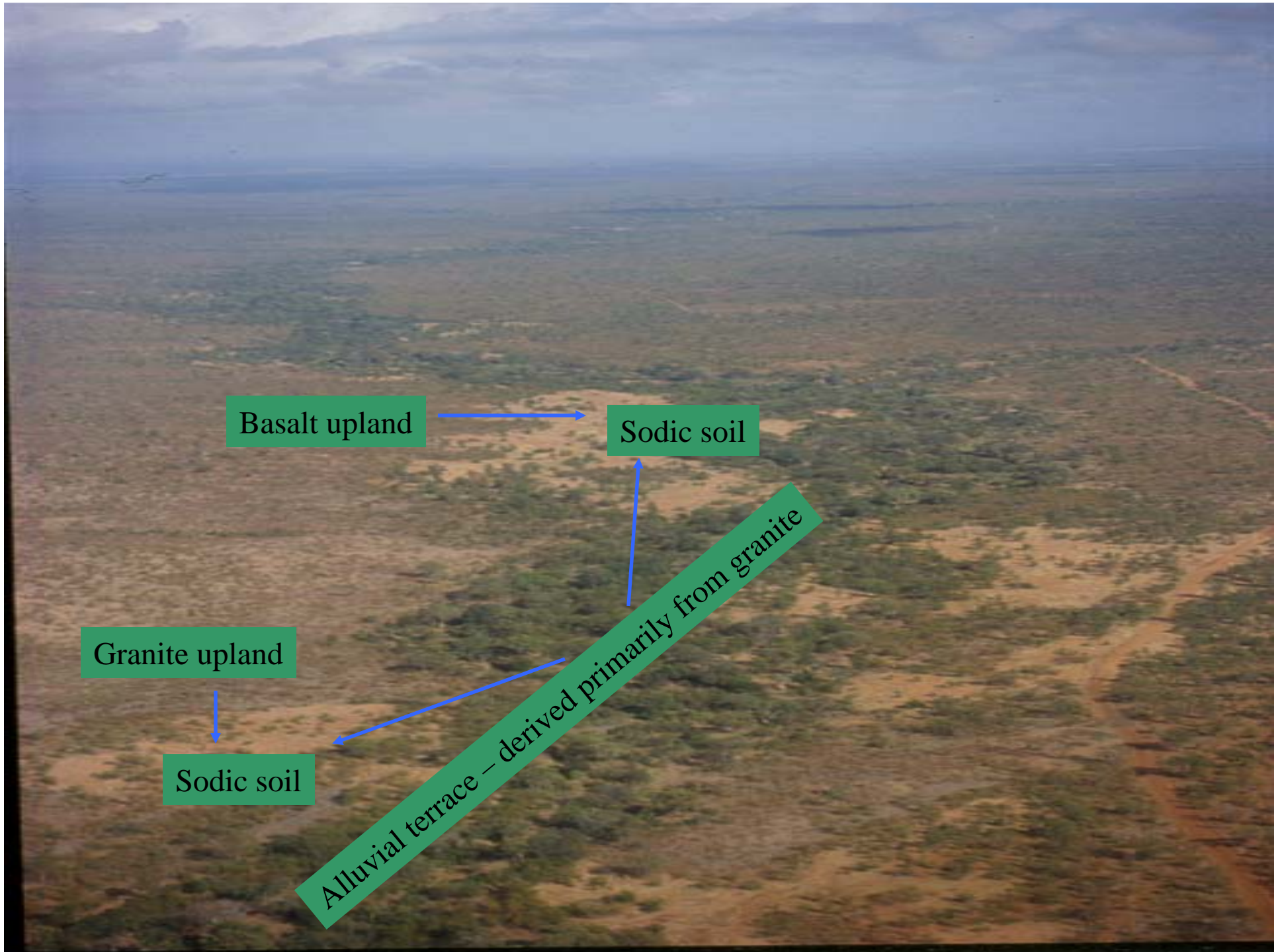
1. Soil characterized by high salt concentration
2. Interface between riparian and upland zones
3. Contrast structurally and functionally with adjacent landscape elements
4. But what is their origin?



# Possible sources of material in sodic soil



There has been no demonstration of what the parent material of sodic soil is, and where the salts are coming from



Basalt upland

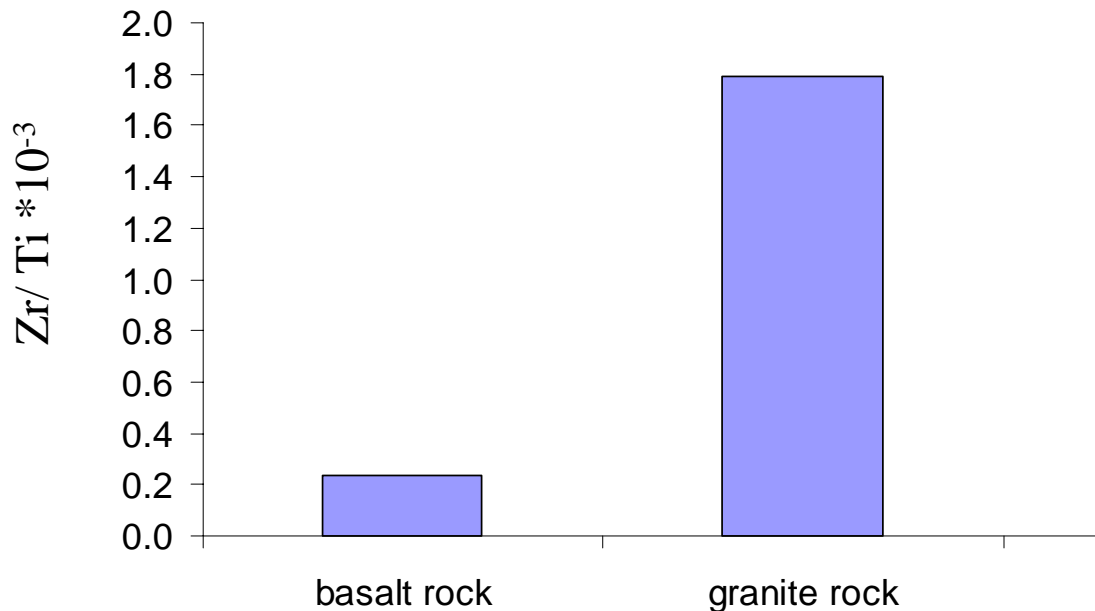
Sodic soil

Granite upland

Sodic soil

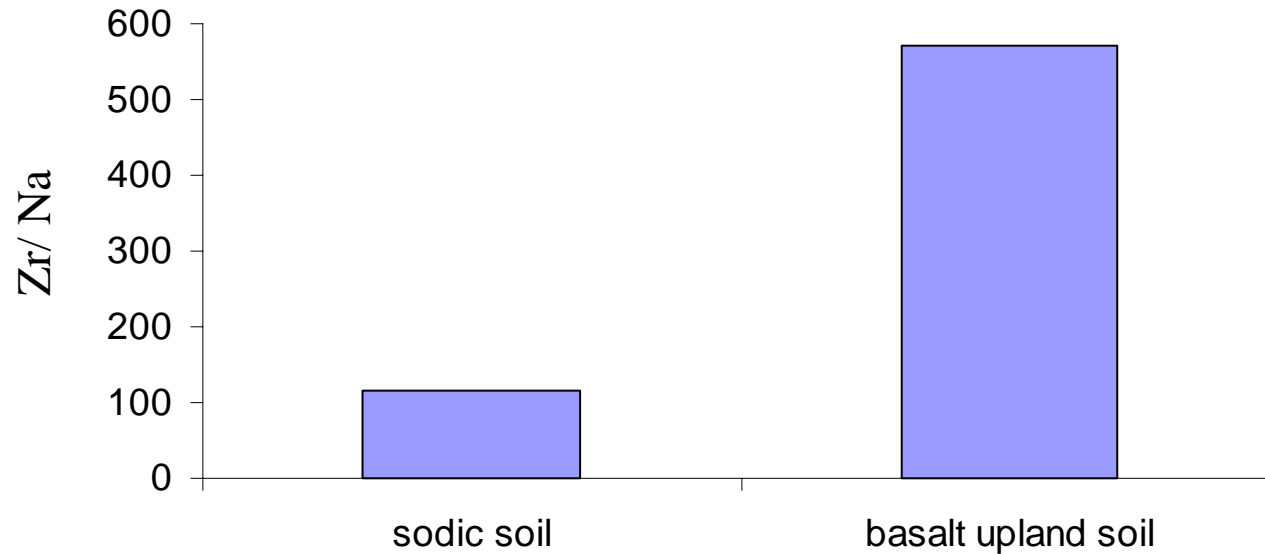
Alluvial terrace - derived primarily from granite

1. Investigated a range of element ratios
2. Zirconium/ Titanium seems diagnostic for the parent materials in the system
3. This rock ratio is conserved in the soil since both elements are not leached
4. Bases, Iron, Silica, Aluminium, etc are leached, therefore are not suitable for estimating provenance

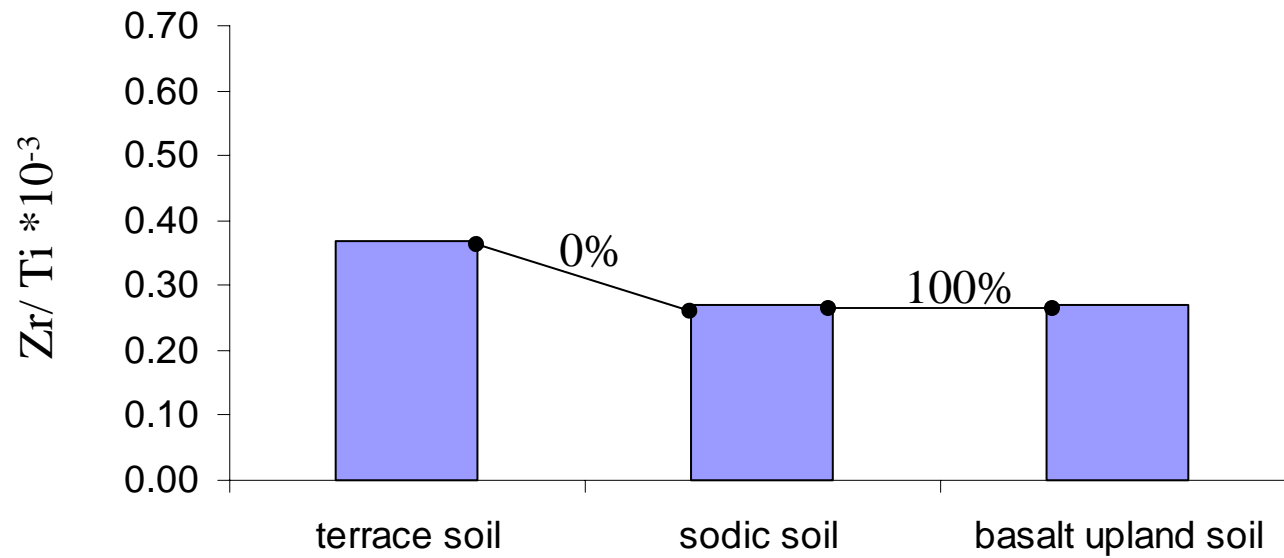


- Use the Zr/ Ti to trace the parent material for the sodic soils

- Now that the parent material is known, we can explore possible pathways for salt accumulation



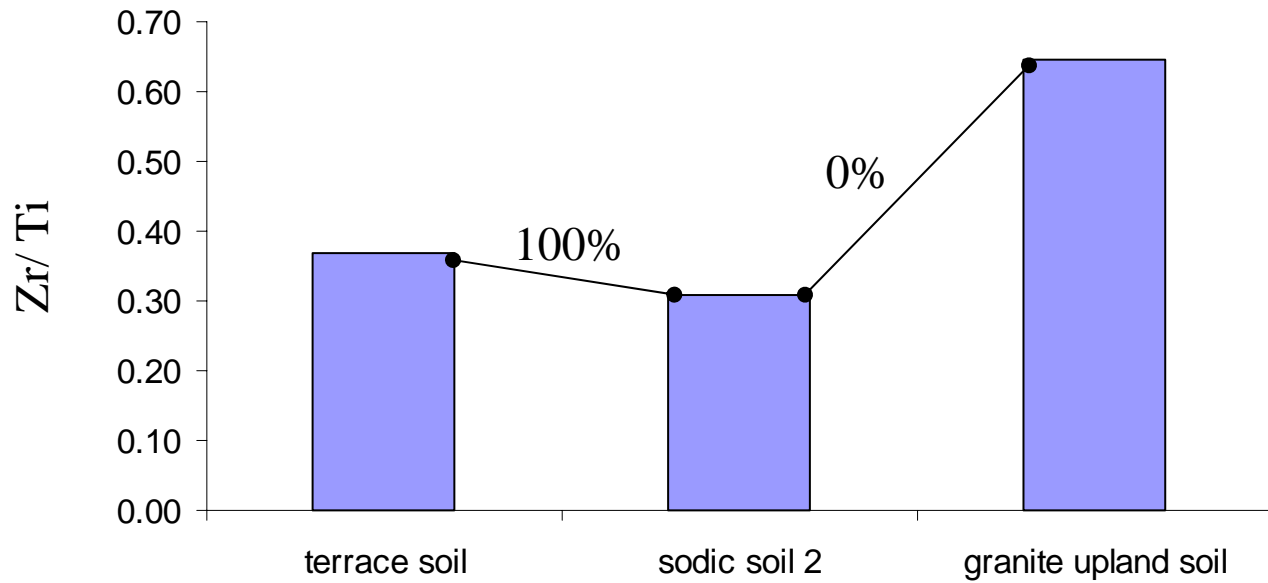
1. Do the salts come from upslope? Are they from the *in situ* weathering of the terrace soil? Are they sourced from the evapotranspirative pump? Are they from dust?
2. Use more precise geochemical tracers
  - Exchangeable Strontium / Calcium
  - Strontium isotopes



1. Used end-member mixing model to calculate basalt soil contribution as a parent material
2. Therefore the basalt is the most likely parent material for the sodic soil

# Acknowledgements

- Andrew W. Mellon Foundation
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- University of California



The parent material for the sodic soil is terrace soil regardless of the what occurs upslope, granite or basalt soil