12-12-2016

Ironstone gravel types in Western Australia: Re-purposing a geological survey to improve soil management

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GOVERNMENT OF WESTERN AUSTRALIA

GRDC Grains Research & Development Corporation

IRONSTONE GRAVEL TYPES IN WESTERN AUSTRALIA

Re-purposing a geological survey to improve soil management



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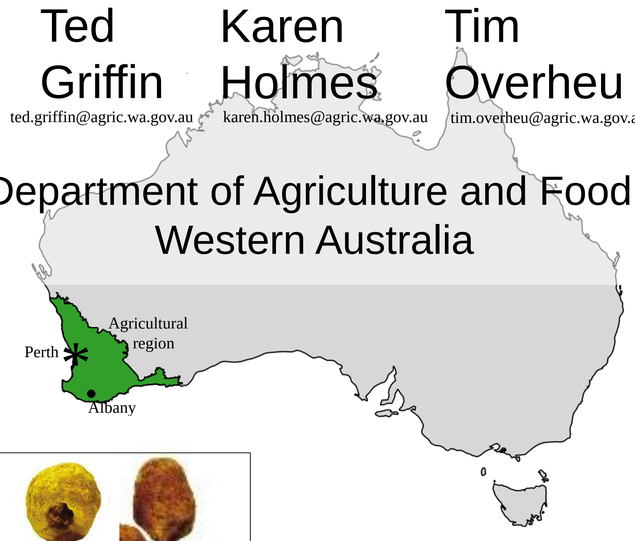
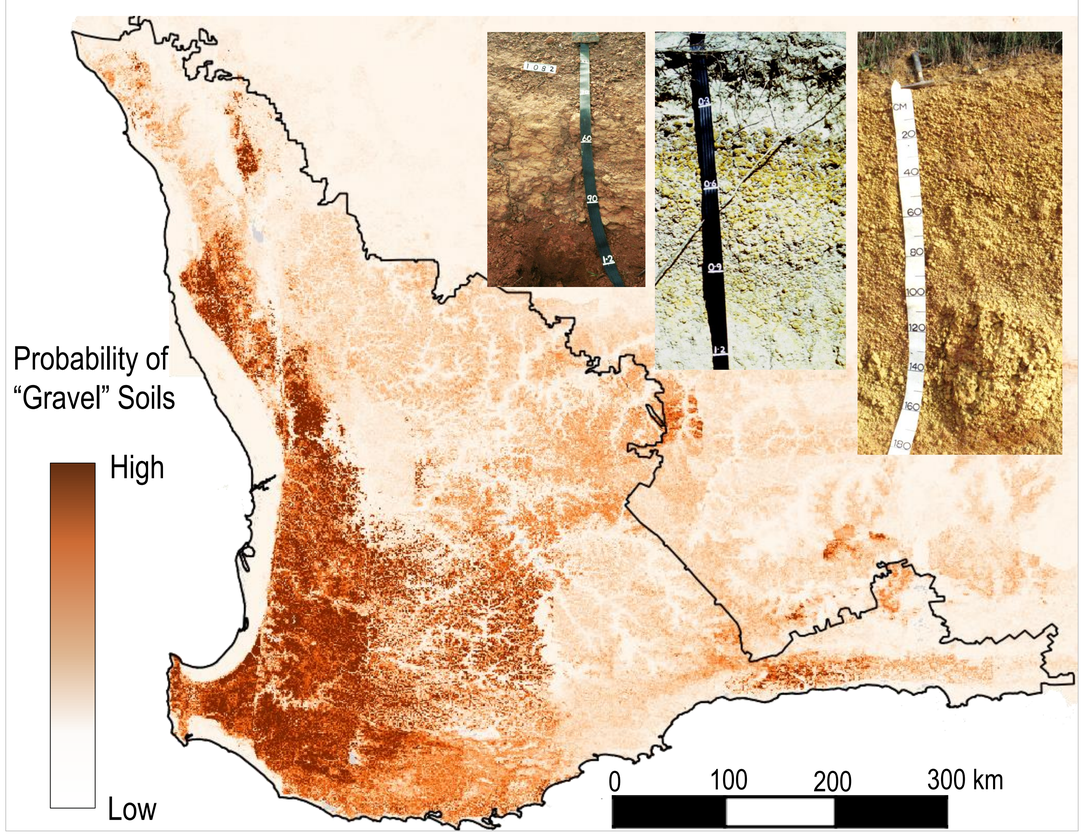
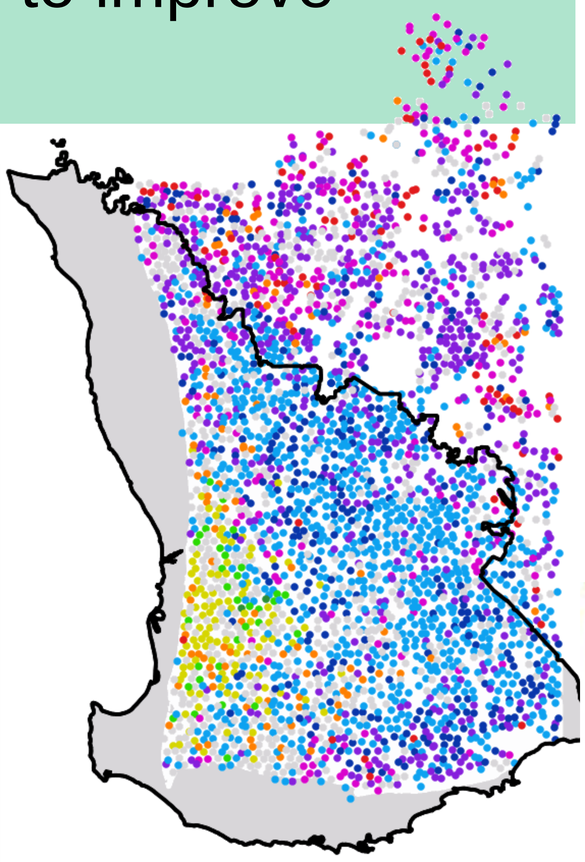
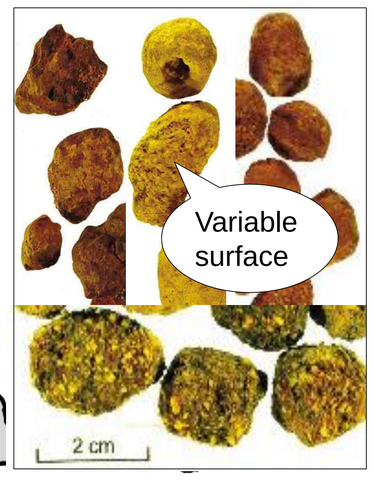


Ironstone gravels common in WA's agricultural region, typically considered inert for cropping

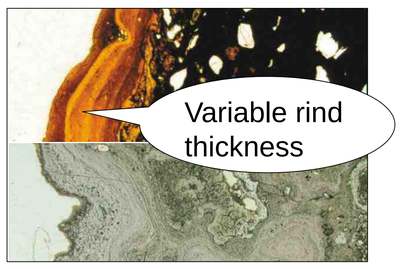




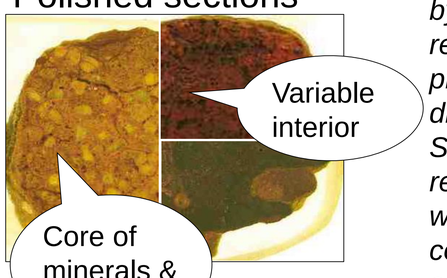
CSIRO & Geological Survey WA: Detailed geochemistry of >3000 samples on Yilgarn Craton *(Cornelius et al. 2007)*



Thin sections



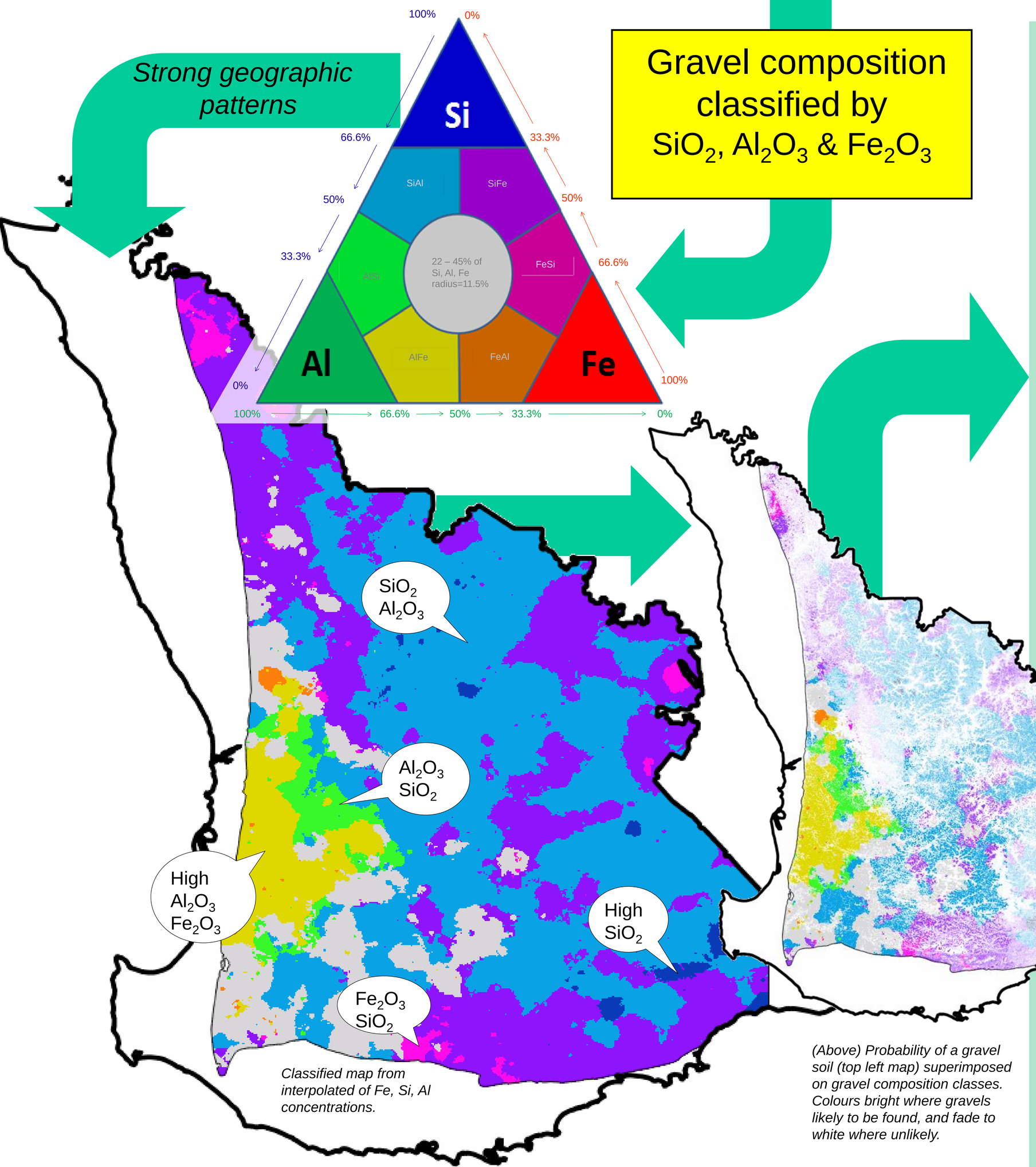
Polished sections



Wide range of mineralogy and morphology, mainly controlled by parent rocks. Often redistributed by landscape processes; evidence of pisolith dissolution and reformation (ie. Some gravels from lateritic residuum, some pedogenic, which adds noise to gravel correlation with parent rock and current landforms.)

Strong geographic patterns

Gravel composition classified by SiO_2, Al_2O_3 & Fe_2O_3



Classified map from interpolated of Fe, Si, Al concentrations.

(Above) Probability of a gravel soil (top left map) superimposed on gravel composition classes. Colours bright where gravels likely to be found, and fade to white where unlikely.

SOIL MANAGEMENT RESEARCH FOCUS

A growing body of evidence suggests gravels play a role in soil water and nutrient retention, but is all 'gravel' the same?

- This is step 1: define gravel types and their distribution
- Design optimal sampling strategy and collect for lab and glass house studies
- Characterise chemistry and morphology
- Plant nutrient interactions
- Soil water consequences
- Soil compaction potential
- Revisit gravel soil classification: update required?

Cornelius, M, IDM Robertson, AJ Cornelius, and PA Morris, 2007. Laterite geochemical database for the western Yilgarn Craton, Western Australia: Western Australia Geological Survey, Record 2007/9, 44p.

http://www.crcleme.org.au/Pubs/OFRSindex.html Reports 116 and 201. Includes data.

This project is supported by GRDC grant DAW00258.