Home and Away:
Checking and improving descriptions of tree species climatic requirements

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Outline

- Objective

- Background – Species distribution models (SDM)
- Plant responses to climate change
- Using ALA along with other systems
  - CABI - Forestry Compendium
  - GBIF - Global Biodiversity Information Facility
- Conclusions

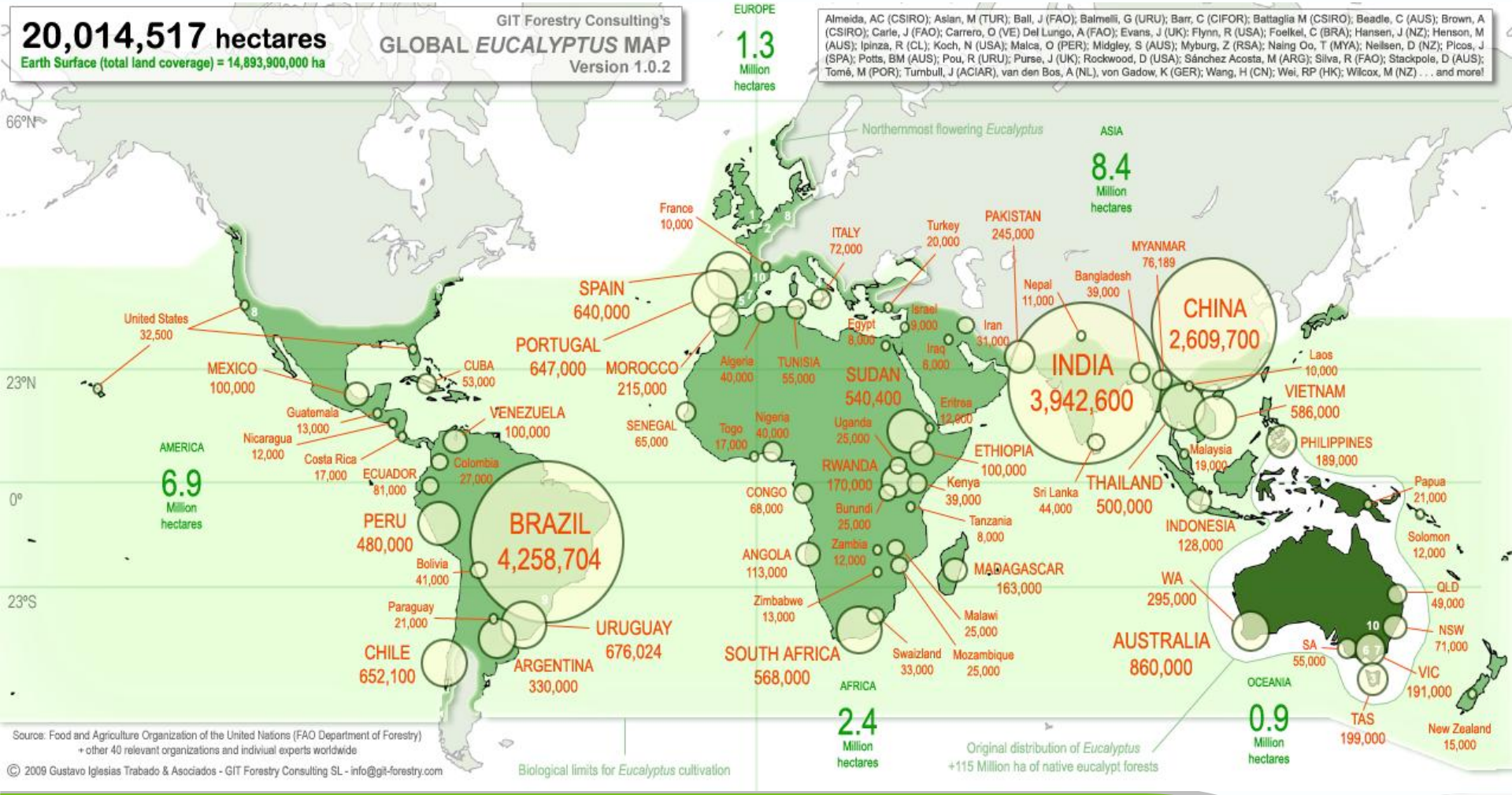
Background

- BIOCLIM – First SDM - 1984
- Realised & fundamental niche (Booth *et al.* 1988) (nat. distrib.) & (o/s trials) – eucalypts, some >4^{o}C
- Global climatological audit proposed (Booth 1991)
  - Climatic interpolations for all countries
  - Spp. natural distributions
  - Trials outside natural distribution
  - Spp. climatic requirements
  - Map suitable areas for particular species

Plant responses to climate change

- Adapt, Evolve, Move or Die
- Eucalypts
  - Very slow to evolve
  - Very poor dispersal
  - Adapt or die
- Many CC studies ignore intrinsic adaptability

>100 eucalypt species tested in >90 countries



Source: GIT Forestry Consulting

CABI Forestry Compendium

Descriptions for >1200 species from around the world

Eucalyptus nitens

Climatic requirements (Plantations)

Mean annual temperature 9 to 18°C

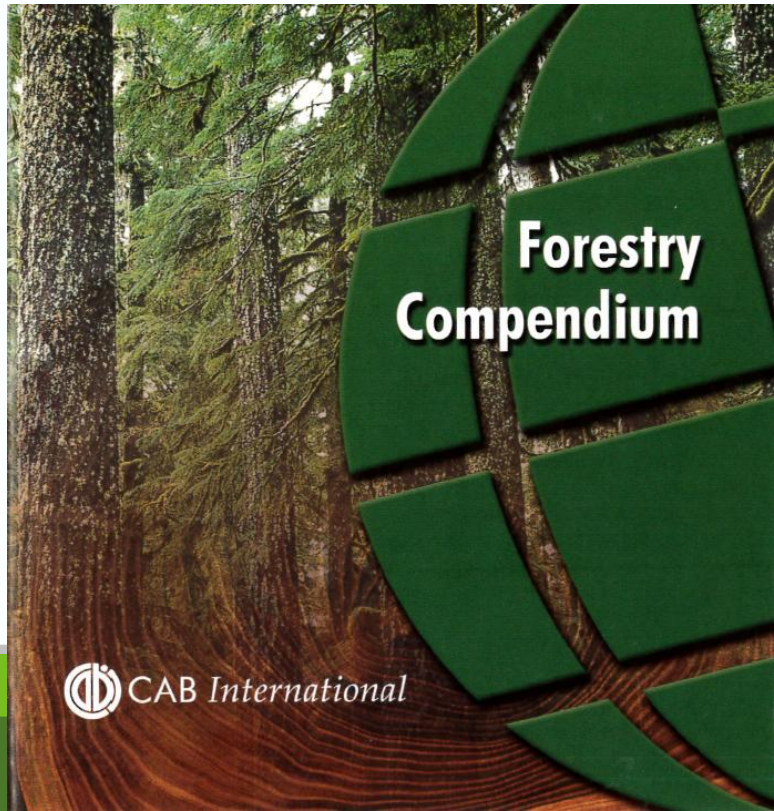
Mean max T hottest month 20 to 28°C

Mean min T coldest month -1 to 7°C

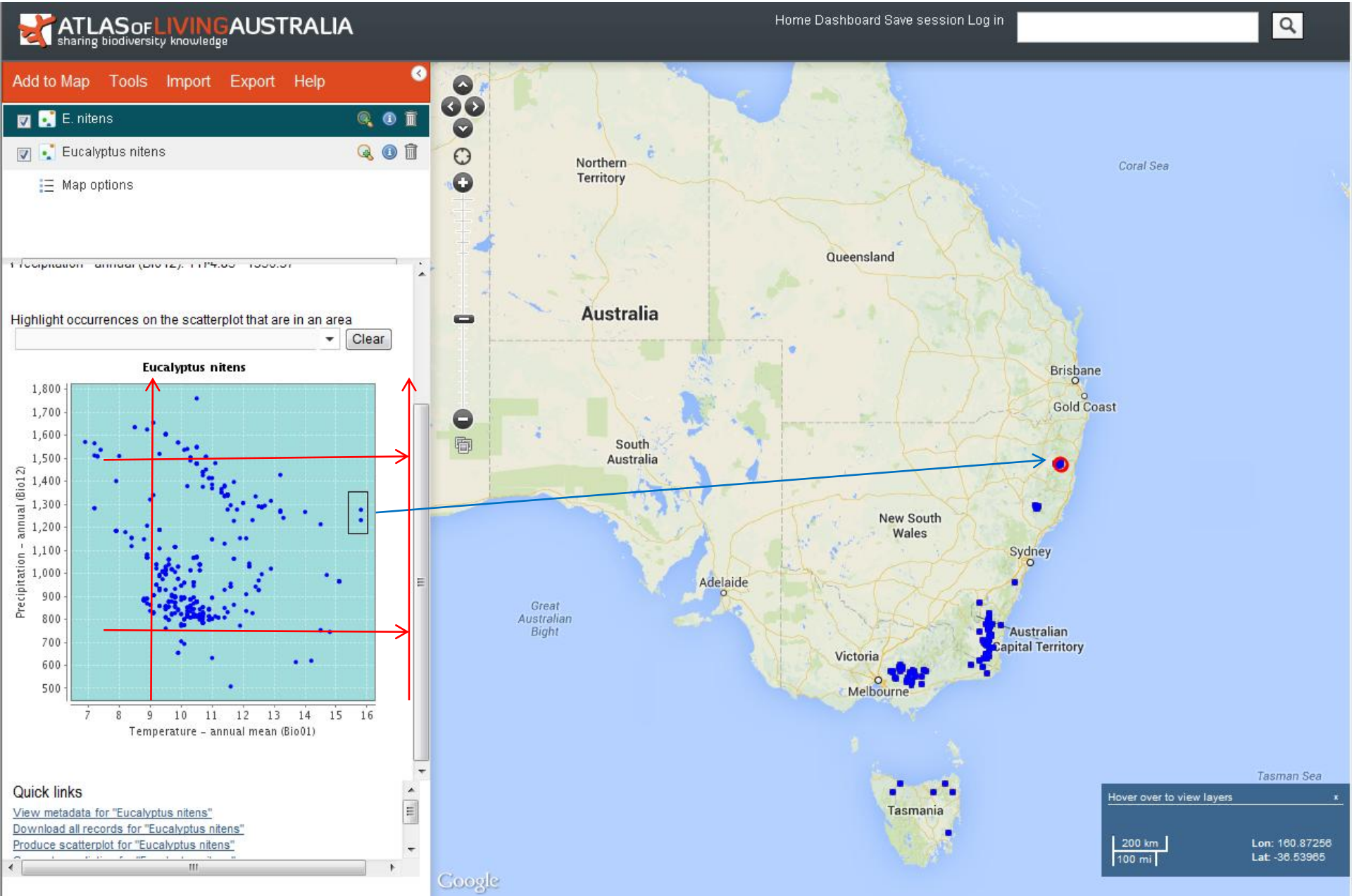
Mean annual precip. 750 to 1500 mm

Booth and Pryor (1991) - expert opinion

- Simple ranges, but could use MaxEnt



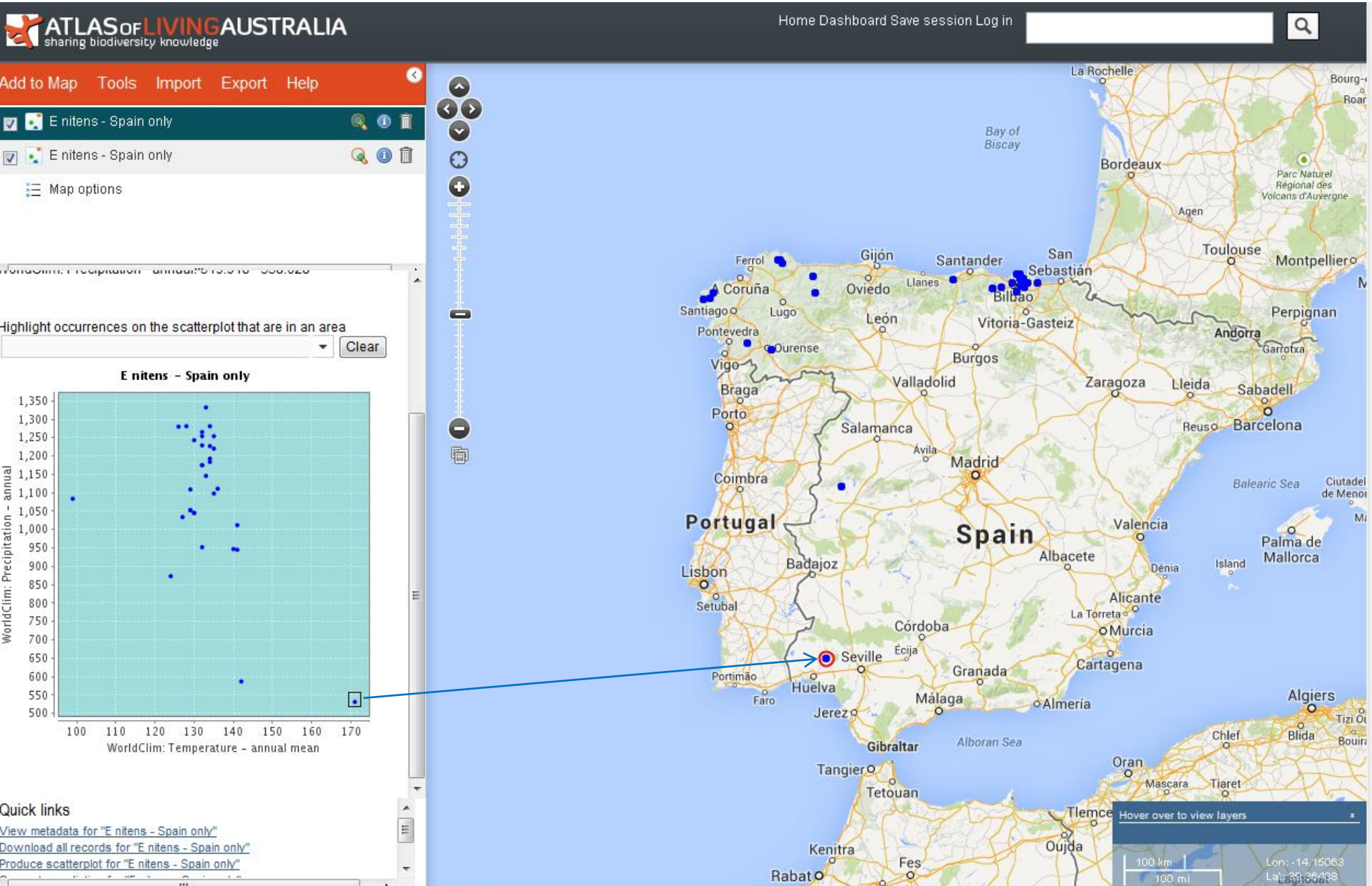
Atlas of Living Australia – *E. nitens*



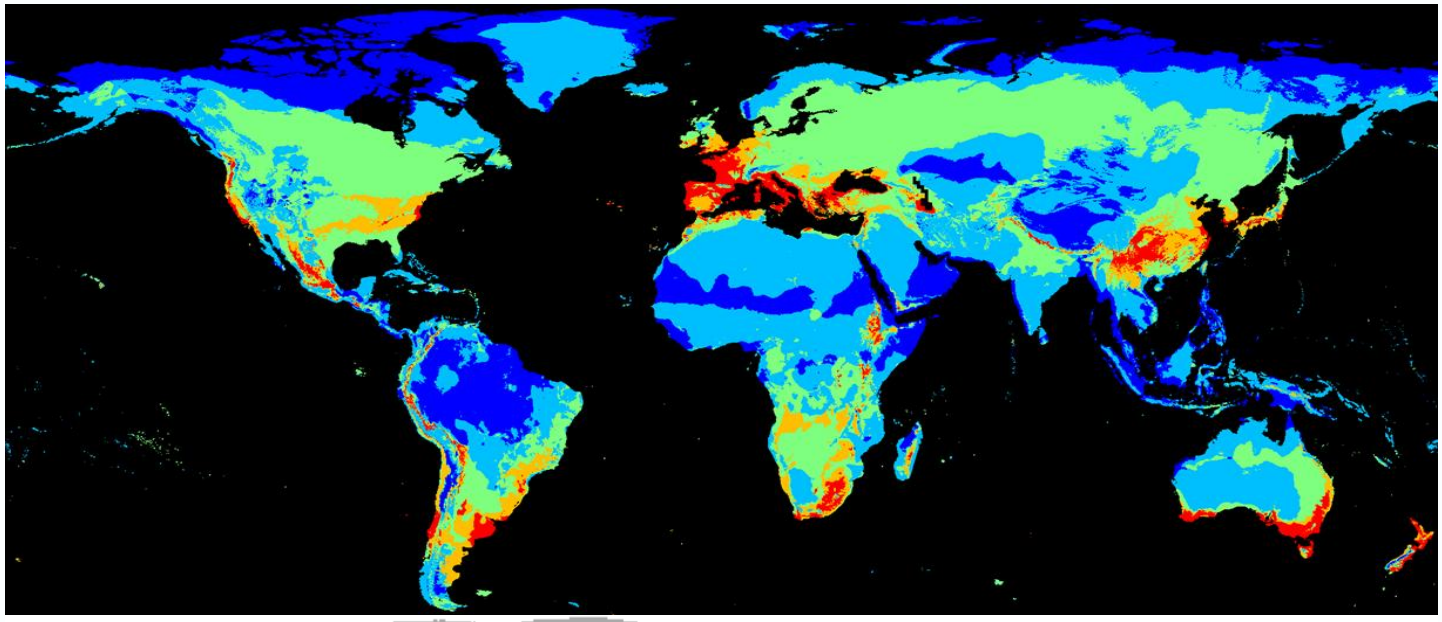
Global Biodiversity Information Facility

- *E. nitens* occurences - Australia 413 (from ALA), Spain 33, Chile 1, New Zealand 5, USA 2, South Africa 1
- Old & new interfaces

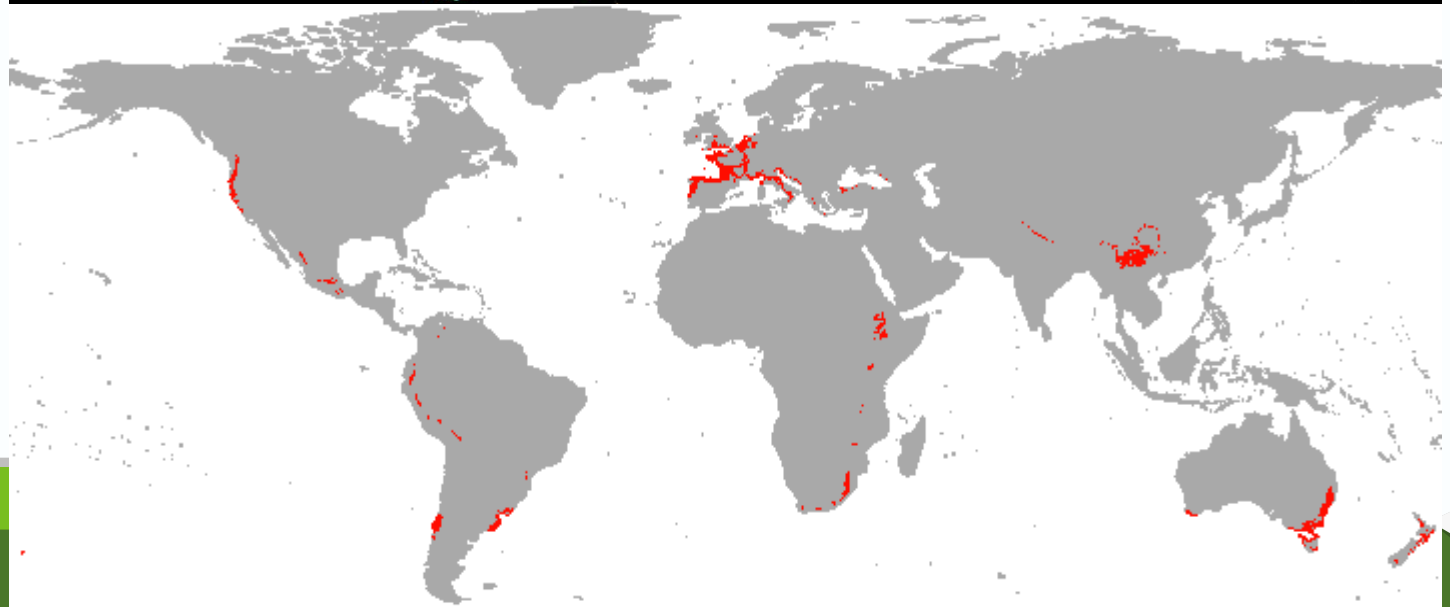
E. nitens - GBIF data – analysed in ALA



E. nitens – GBIF niche & CABI (2005)



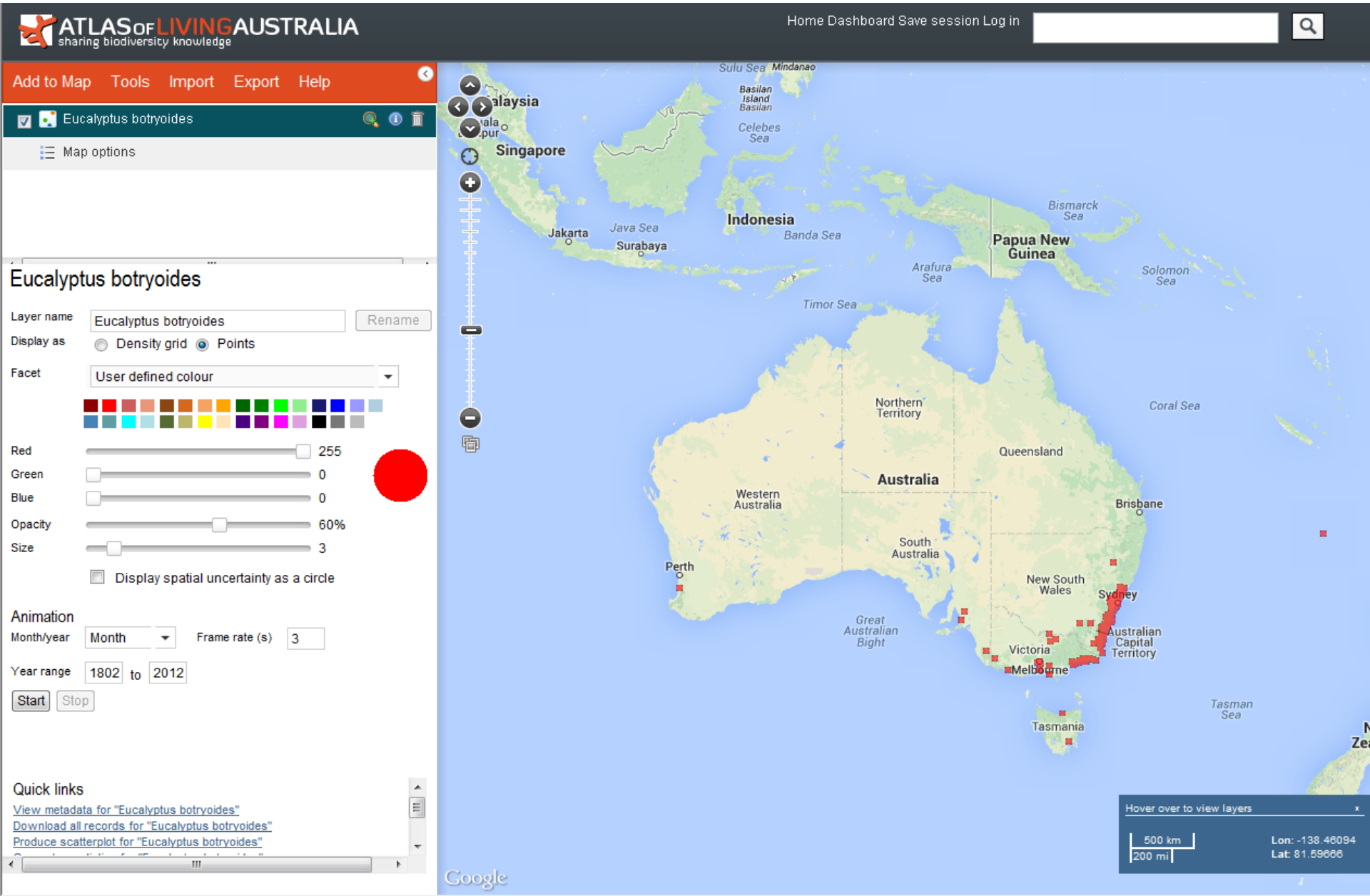
GBIF incl. ALA data



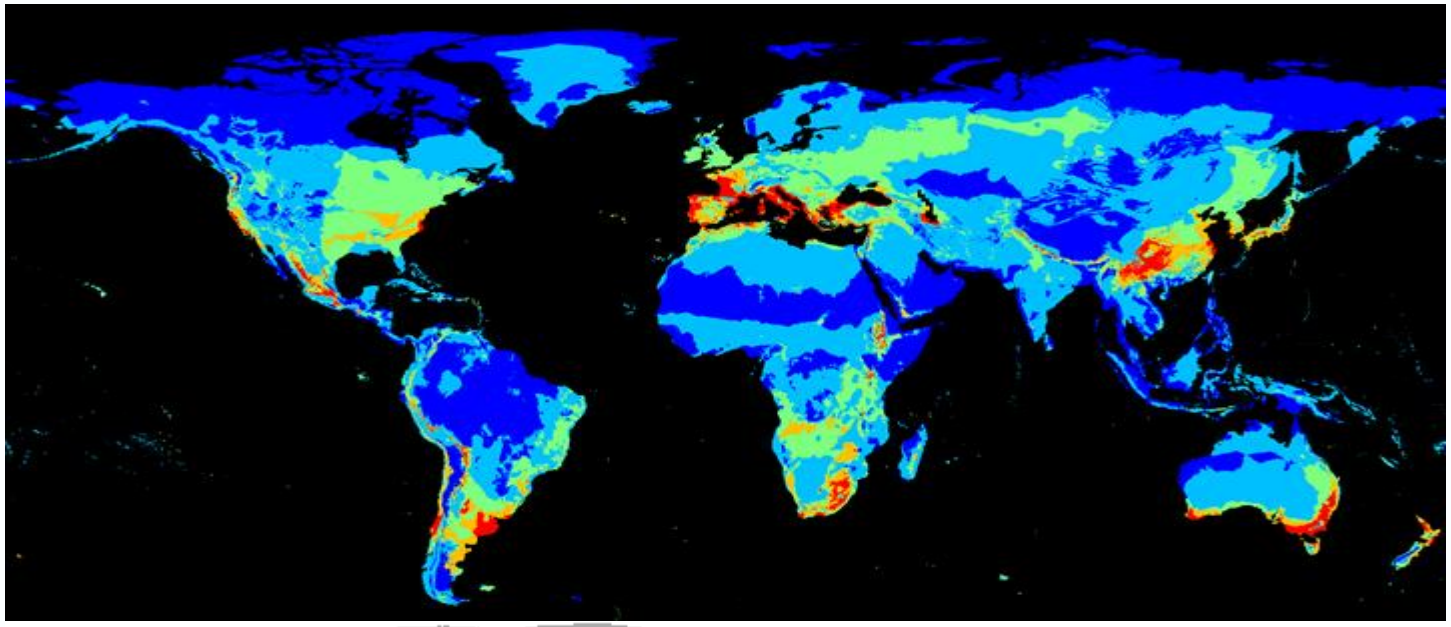
Red - most suitable

CABI – Booth & Pryor 1991

E. botryoides – a lesser-known eucalypt



E. botryoides – GBIF niche & CABI (2005)

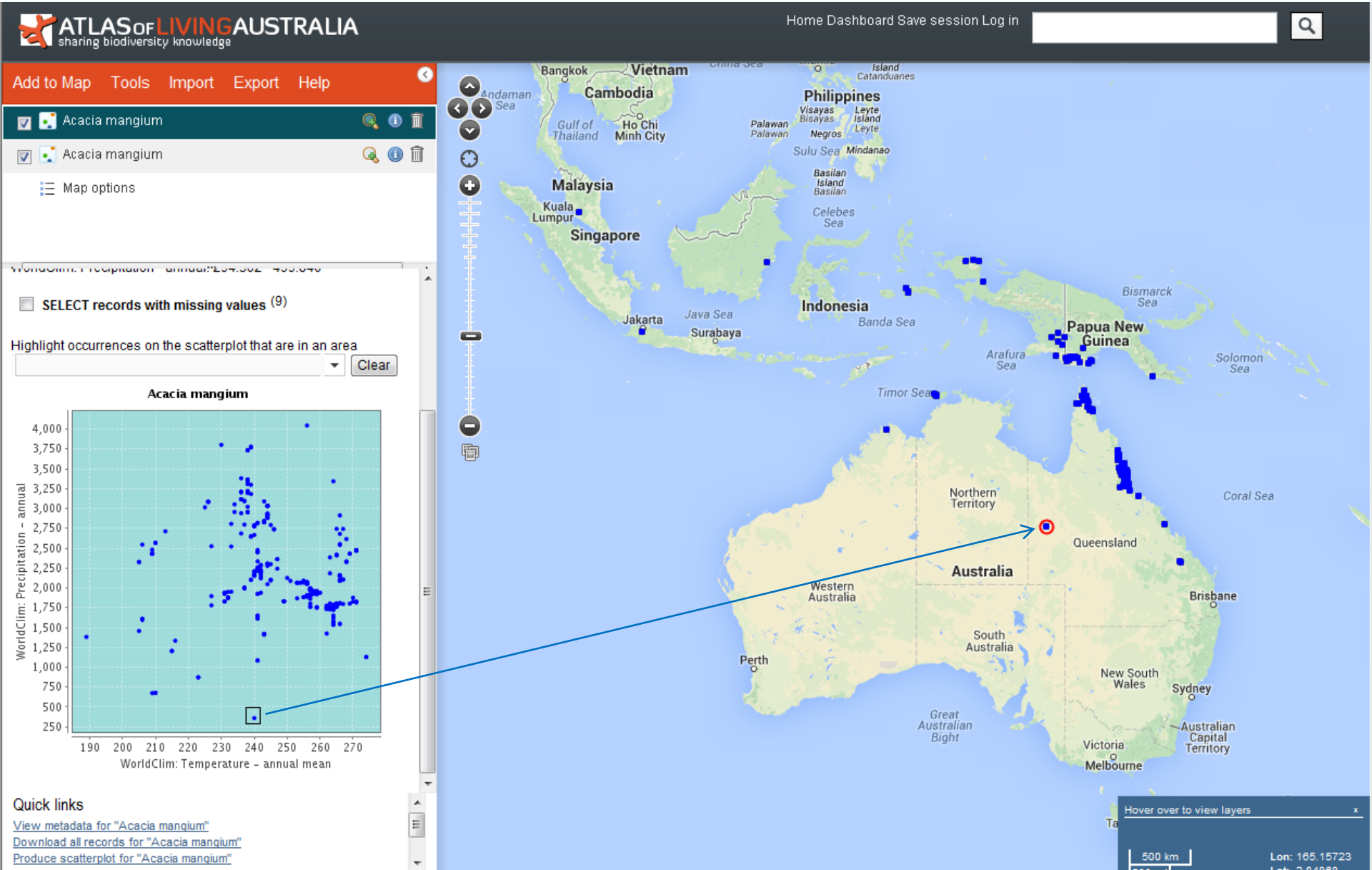


GBIF incl. ALA data

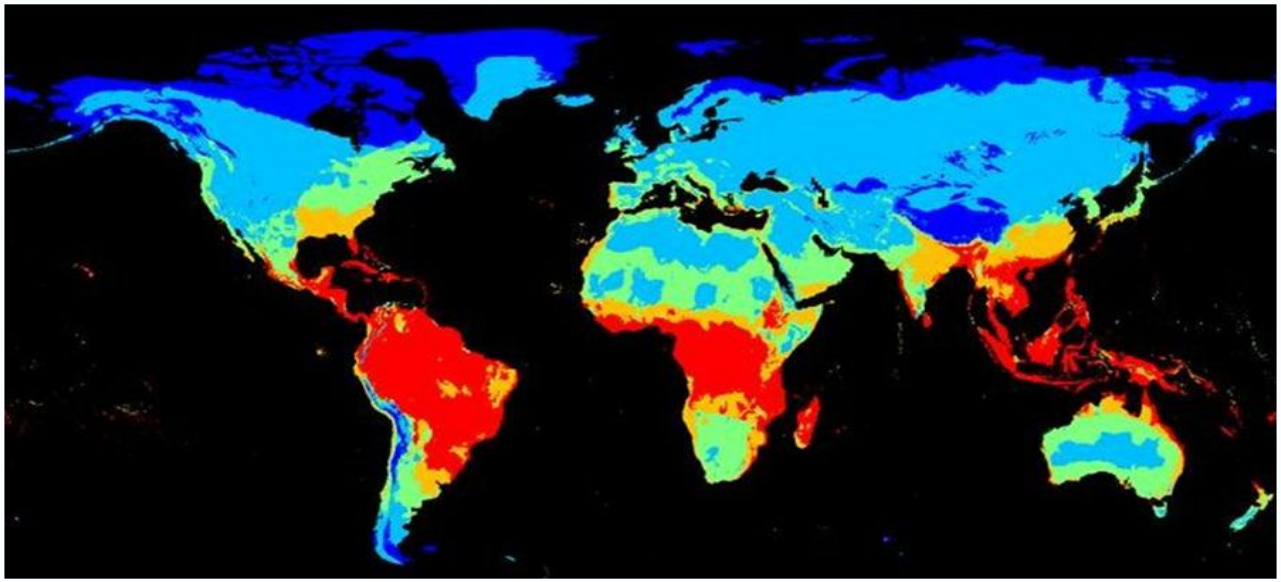
Red - most suitable

CABI

Acacia mangium



Acacia mangium – GBIF niche & Expert

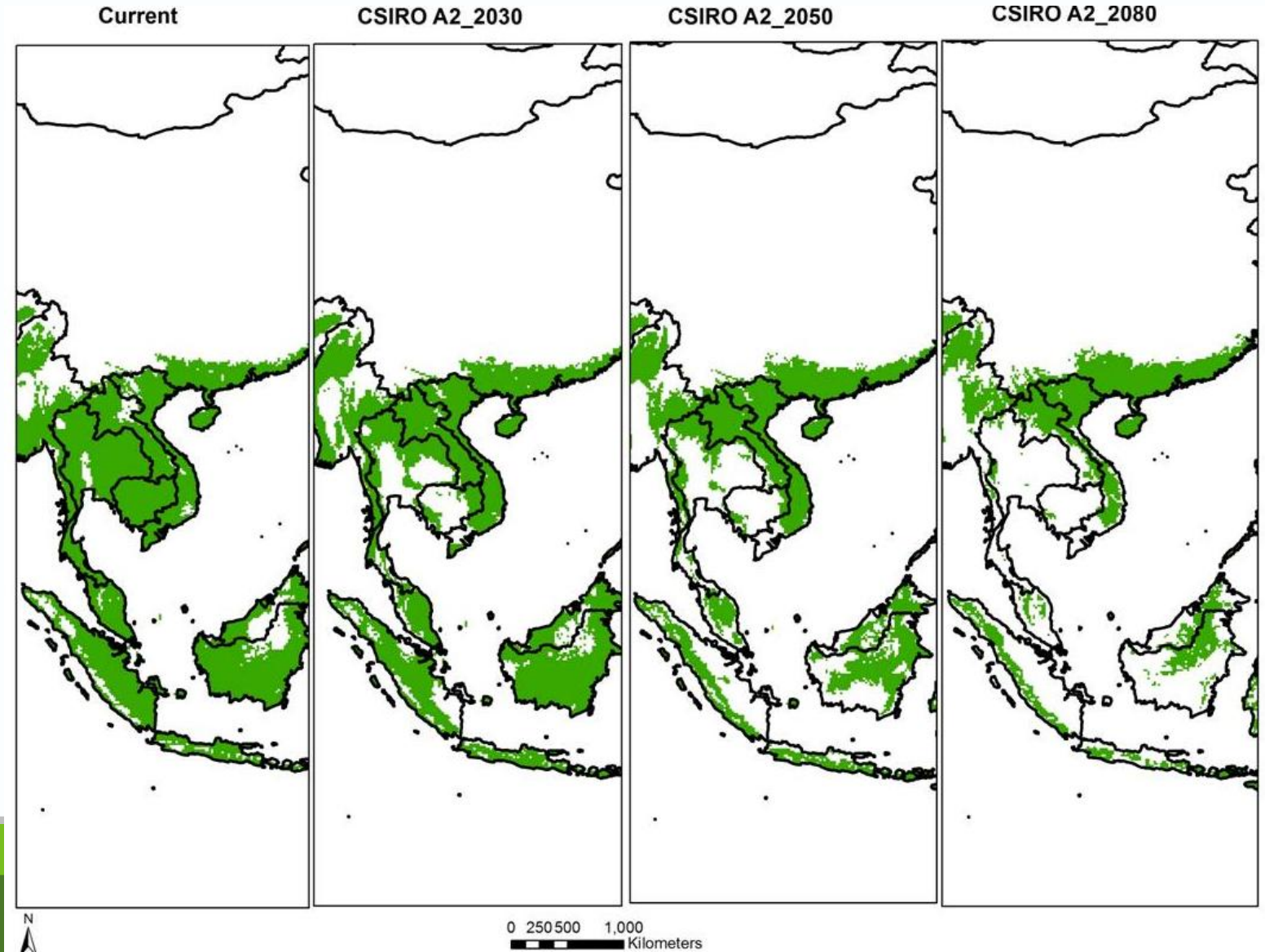


GBIF incl. ALA data

Harwood

Acacia mangium – plantations – CliMond

Booth, Jovanovic & Harwood (2014), New Forests, 45, 507-522



Green - most suitable

Conclusions

- ALA together with CABI (2005) & GBIF can assist
- Help manage stands under climate change
- Intrinsic climatic adaptability
- Limitations

  GBIF – ‘occurrences’ not all geocoded

  GBIF – not comprehensive
- Improvements - provenance information
- For more info see Booth (2014) Using biodiversity databases .. . Forest Ecology & Management 315, 95-102 also Booth *et al.* (2014) A generic method.., New Forests

Thank you

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