

# Economic impacts of coral reef degradation caused by climate change and ocean acidification

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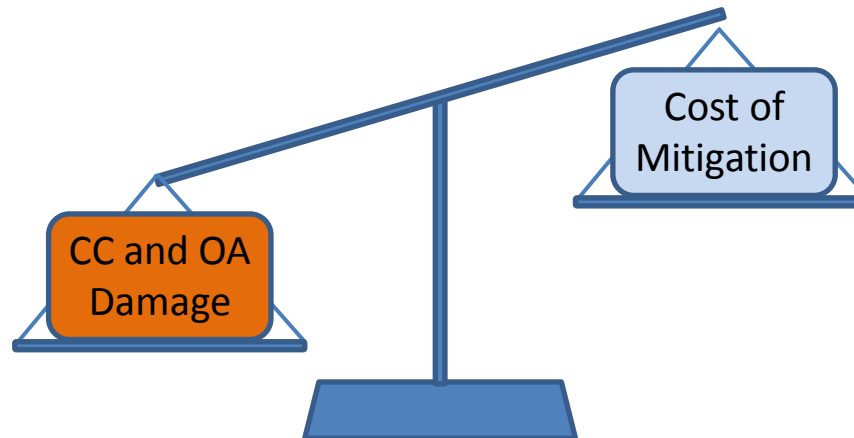
# Outline

- Economic questions on climate change and OA
- Coral reef impacts: ecosystem services framework
- Global coral reef damages from ocean acidification
- Conclusions



# Economic questions on climate change and ocean acidification

- What are the human welfare impacts of climate change (expressed in monetary terms)?
- Do the benefits of mitigation and adaptation (reduced climate change damage) outweigh the costs?
- What is the expected distribution of damages?

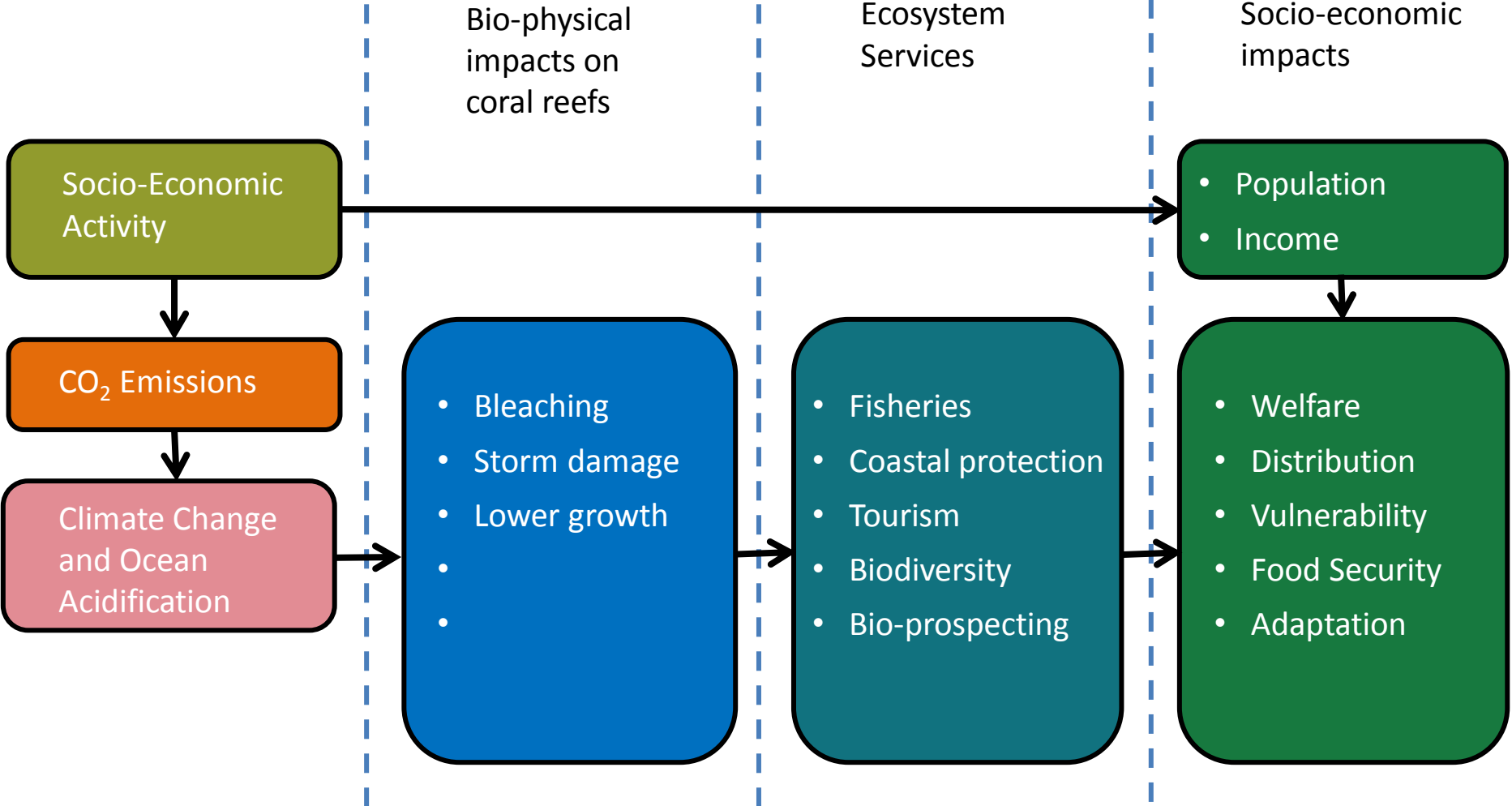


# Framework for coral reef impact assessment

- Ecosystem Services (ES) framework to link bio-physical environmental change to human welfare
- ES are the benefits that humans derive from ecosystems
- Coral reef ES:
  - Fisheries
  - Coastal protection
  - Tourism/recreation
  - Biodiversity
  - Bio-prospecting



# Impact pathway for coral reefs

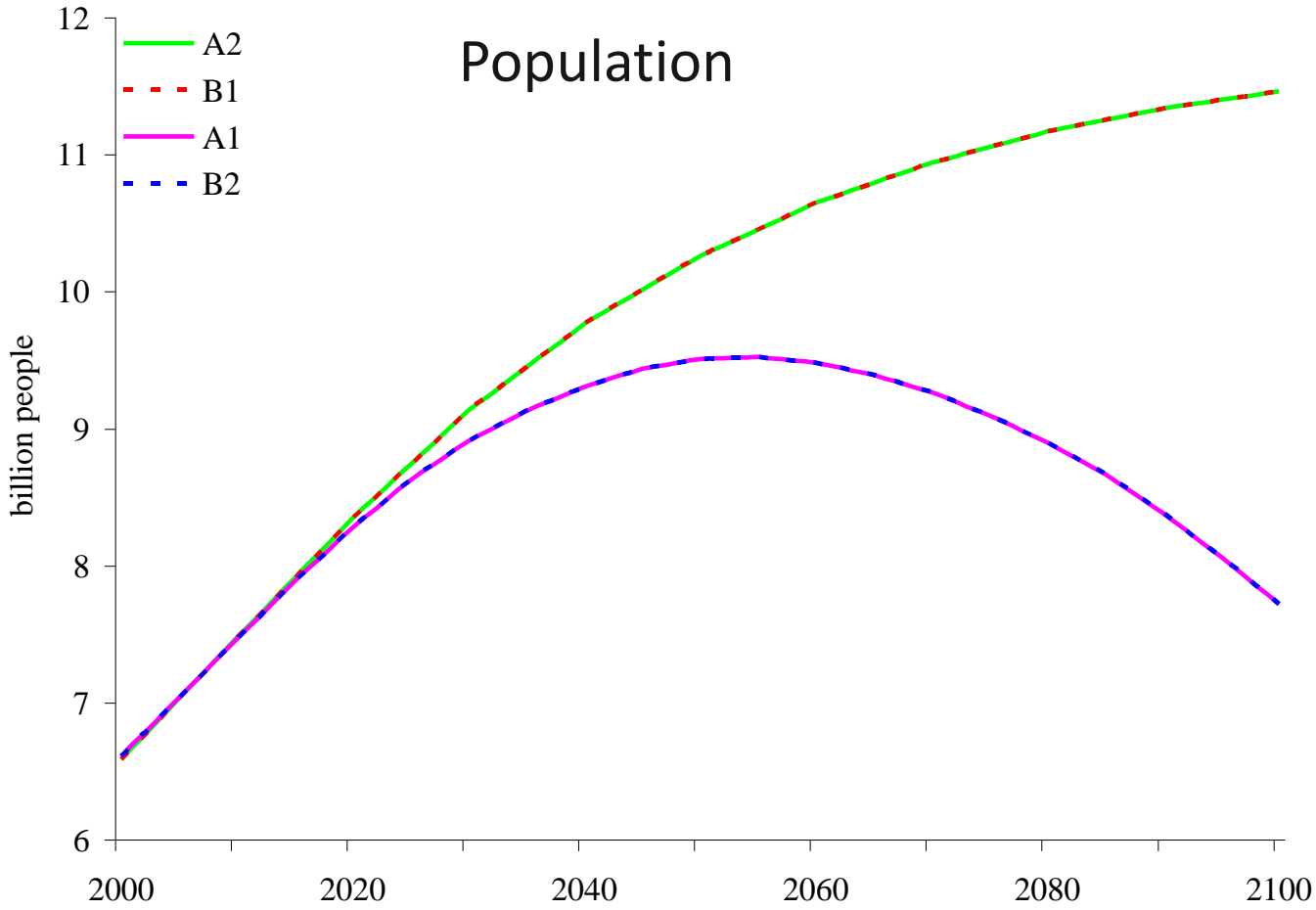


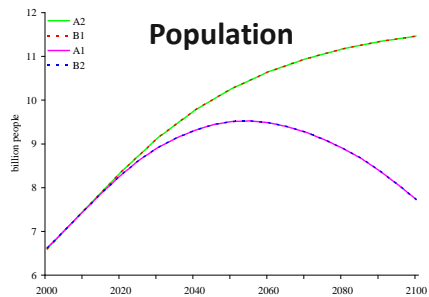
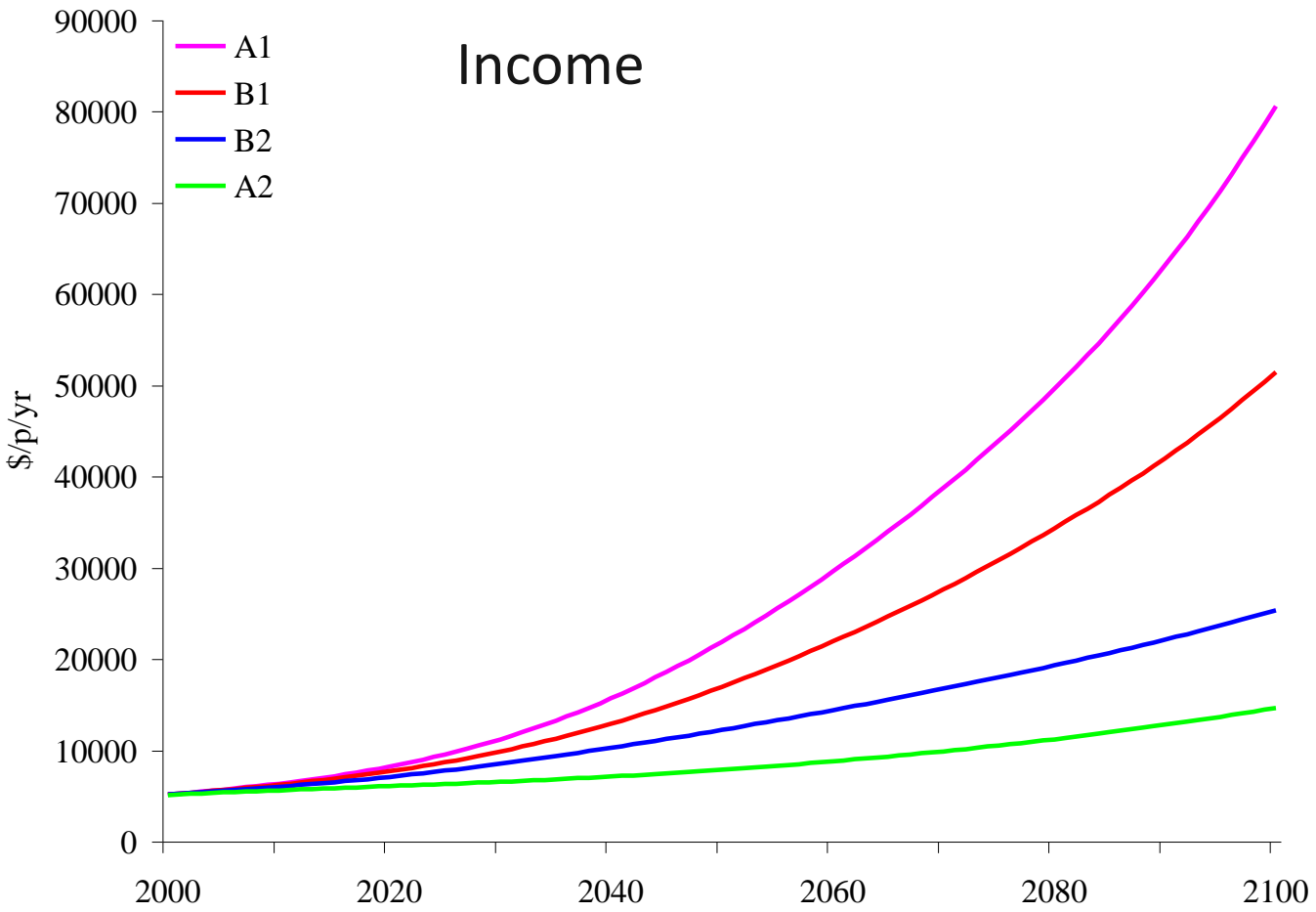
# Coral reef degradation from OA

- Link models that describe the impact pathway for coral reefs:
  - Economy-Climate (FUND)
  - Ocean acidification
  - Coral loss
  - Visitor demand
  - Ecosystem service values
- Scenario analysis 2000-2100 (SRES)



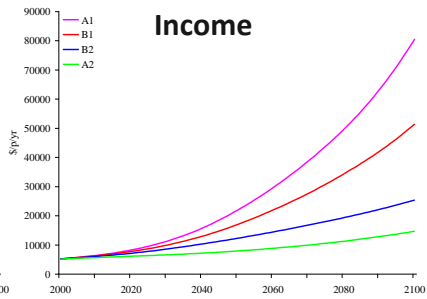
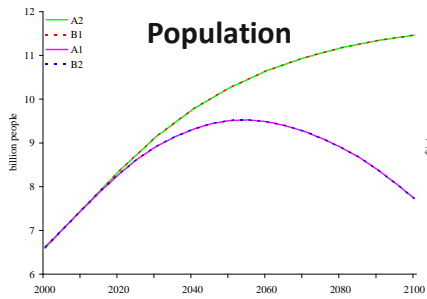
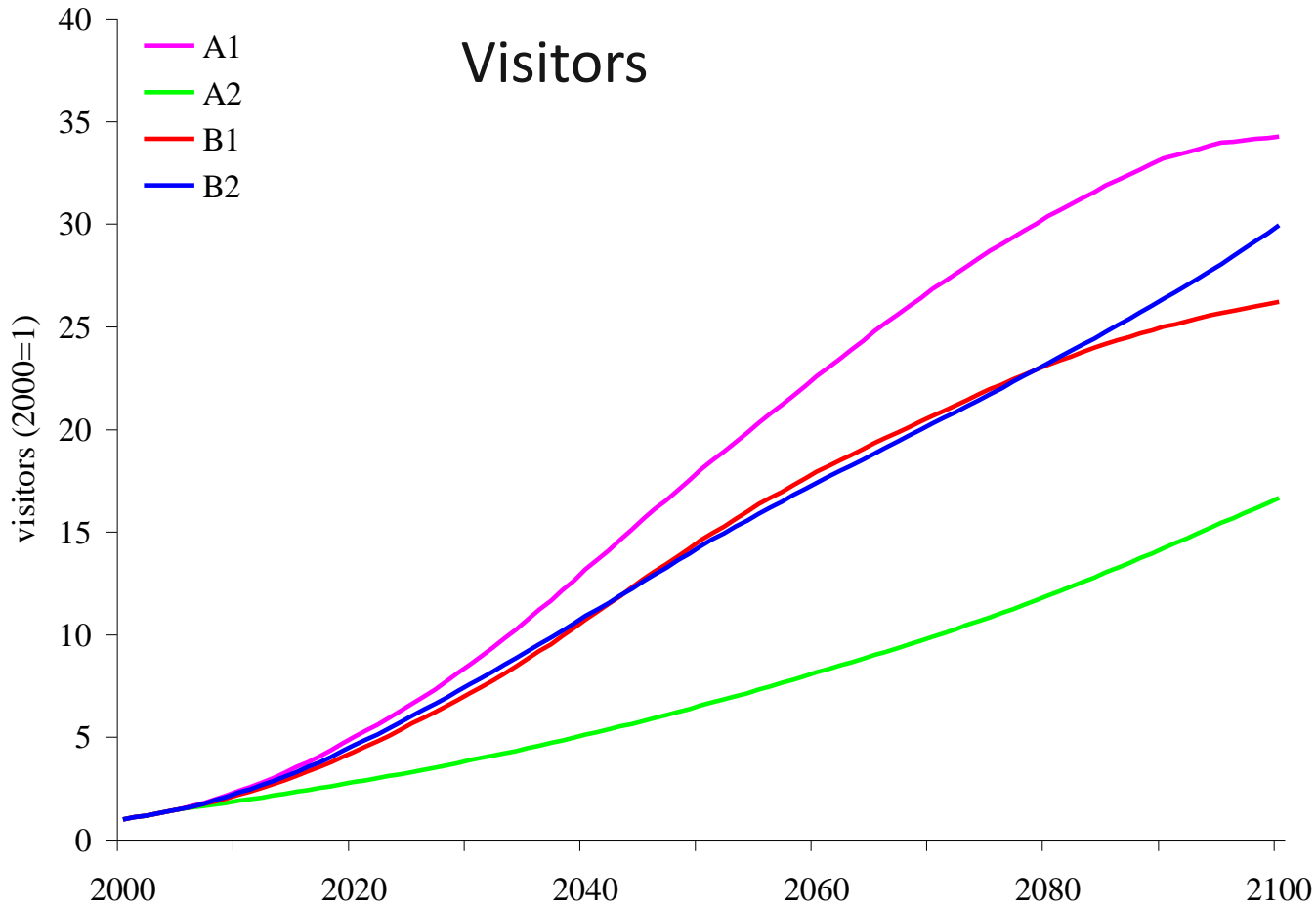
# Population



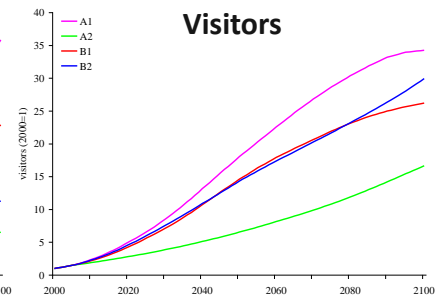
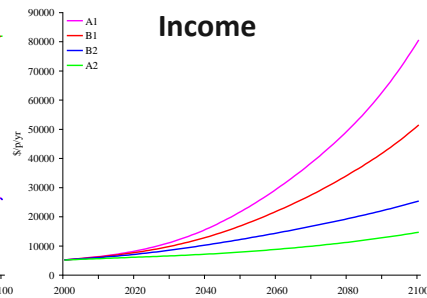
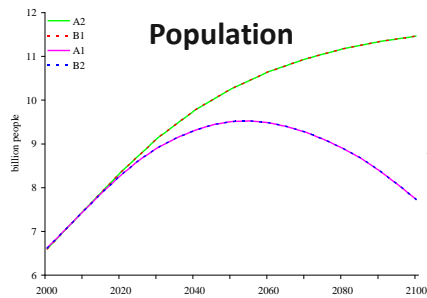
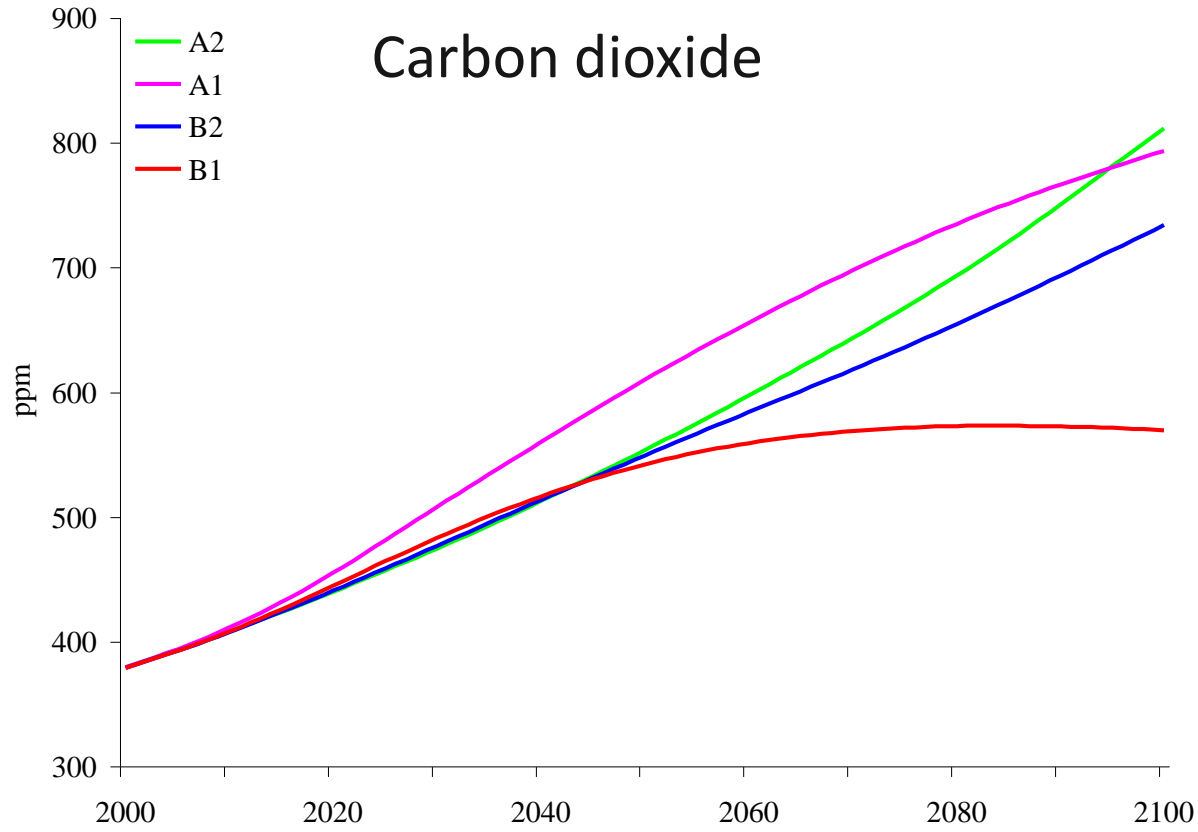


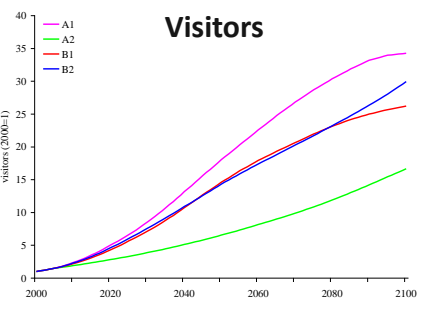
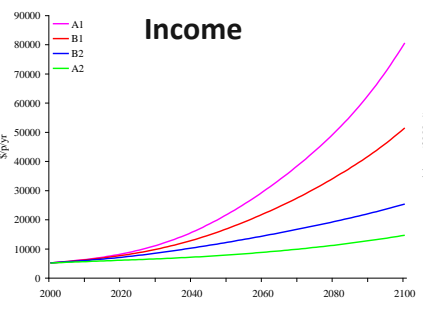
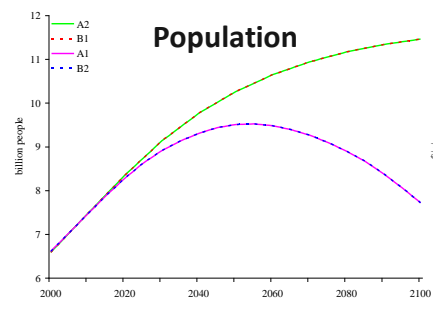
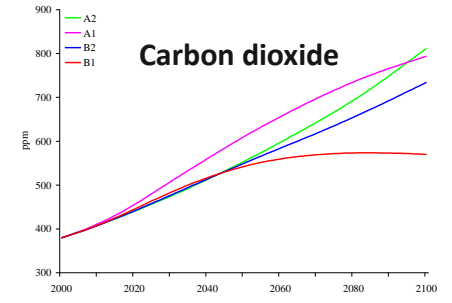
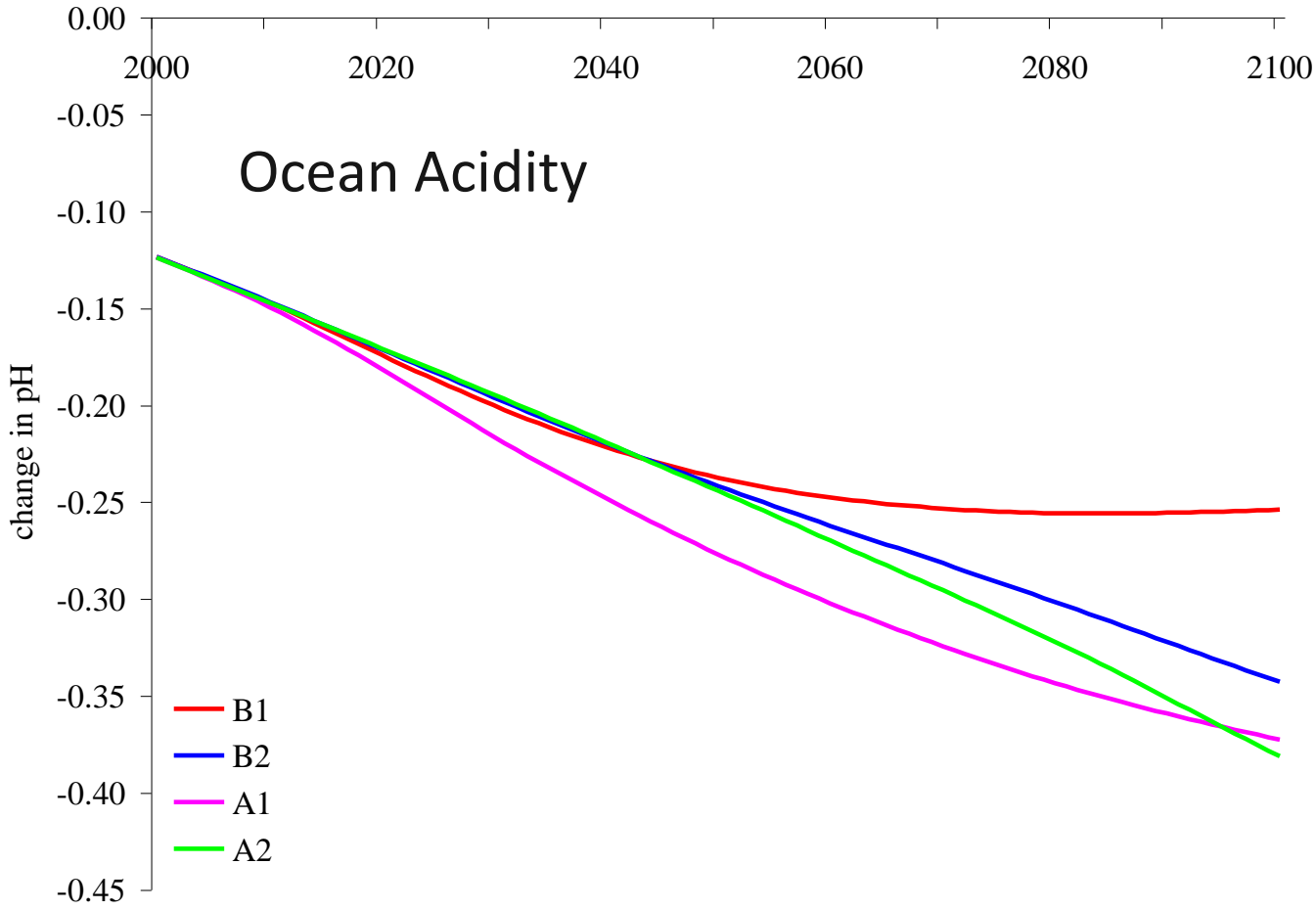


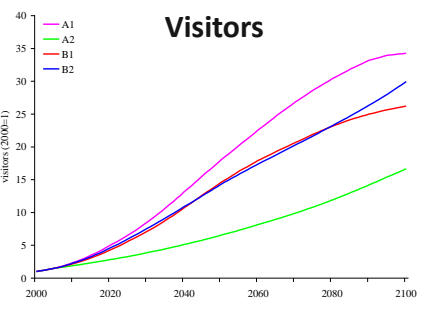
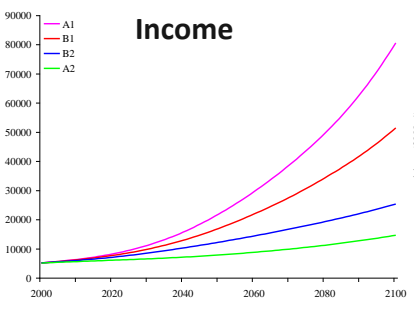
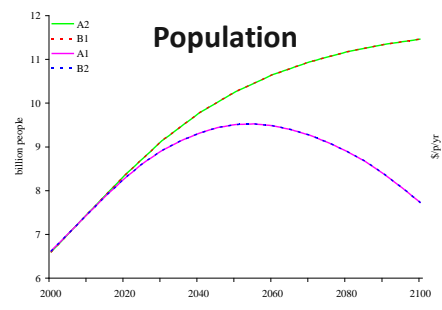
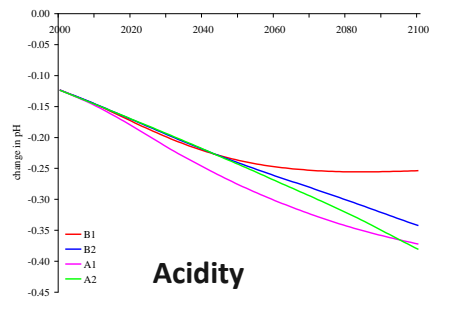
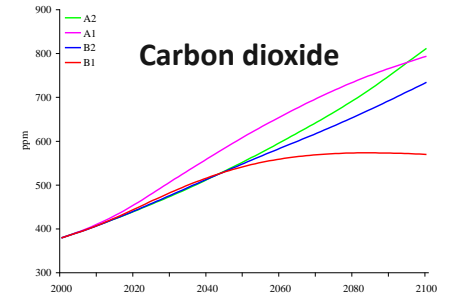
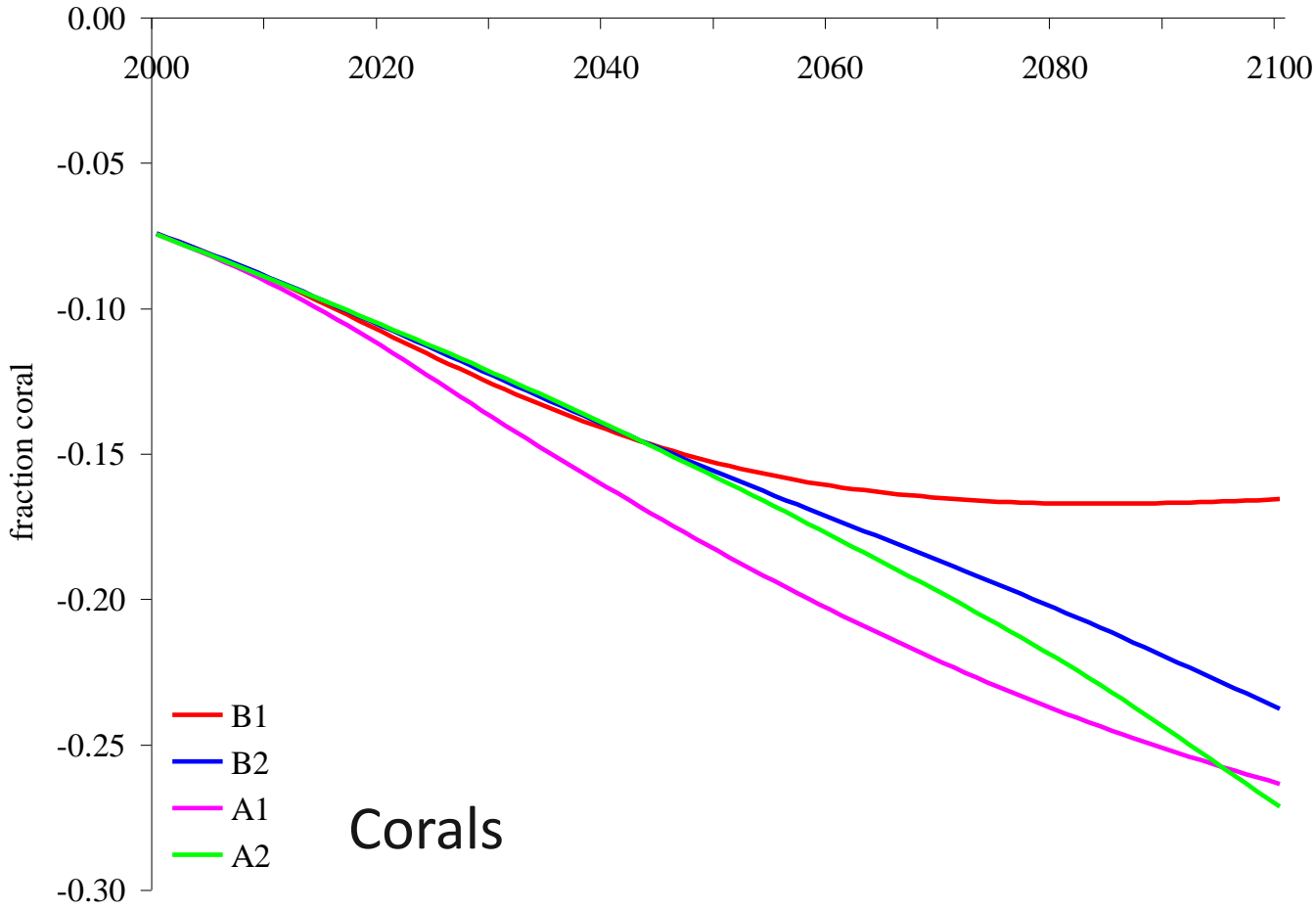
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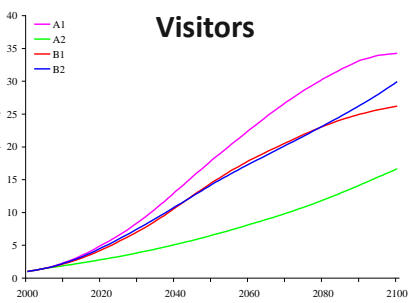
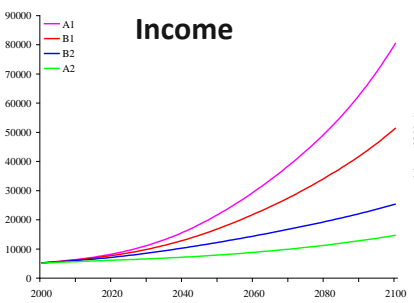
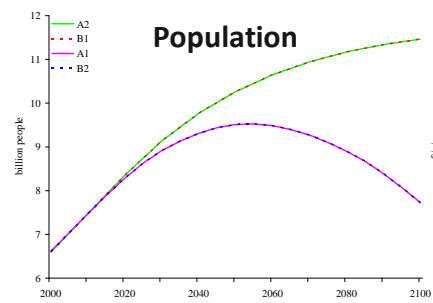
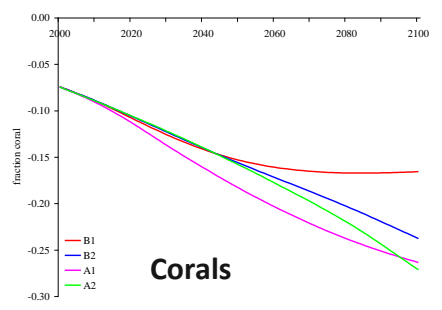
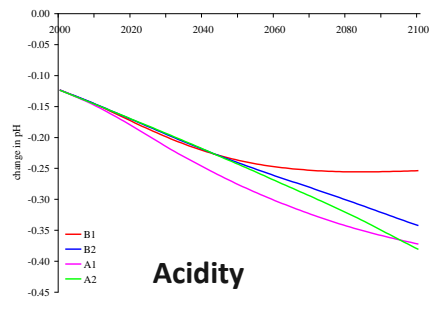
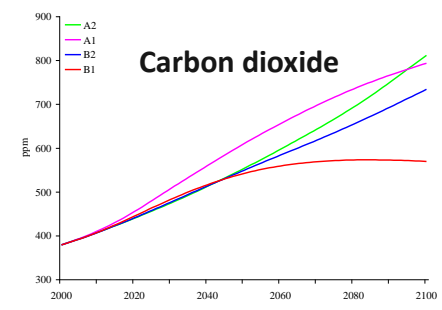
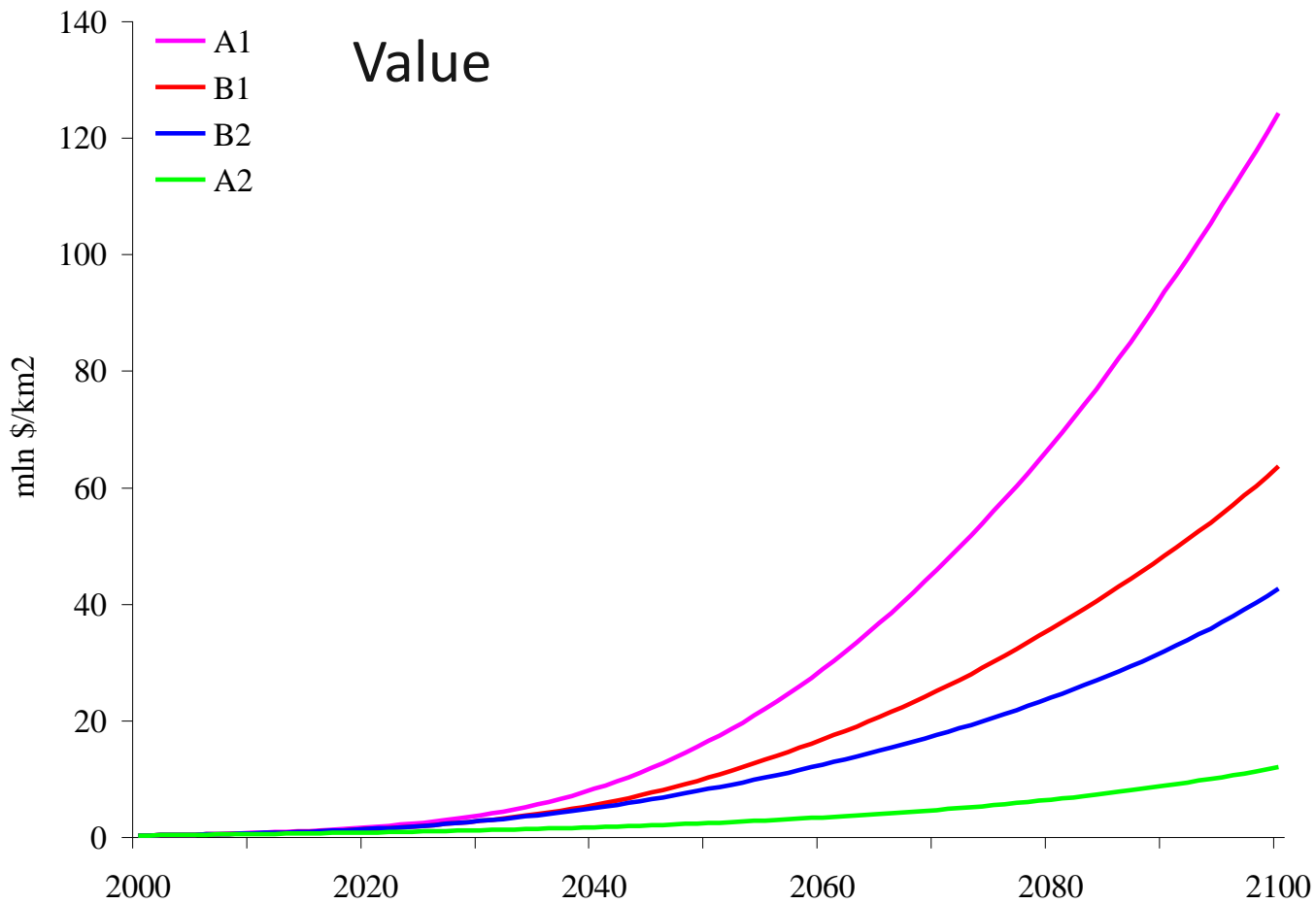


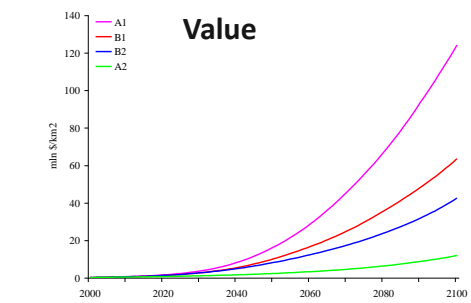
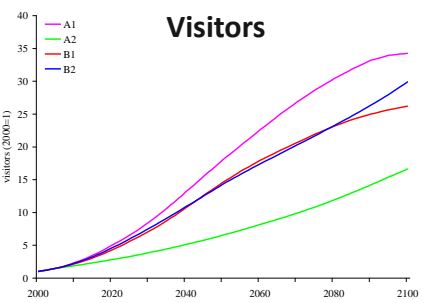
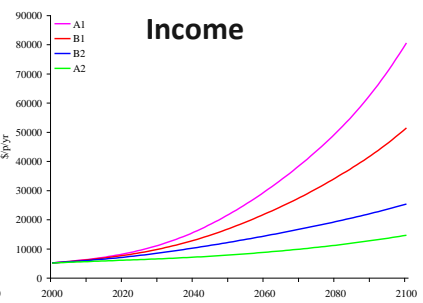
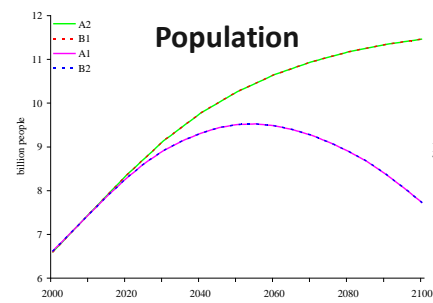
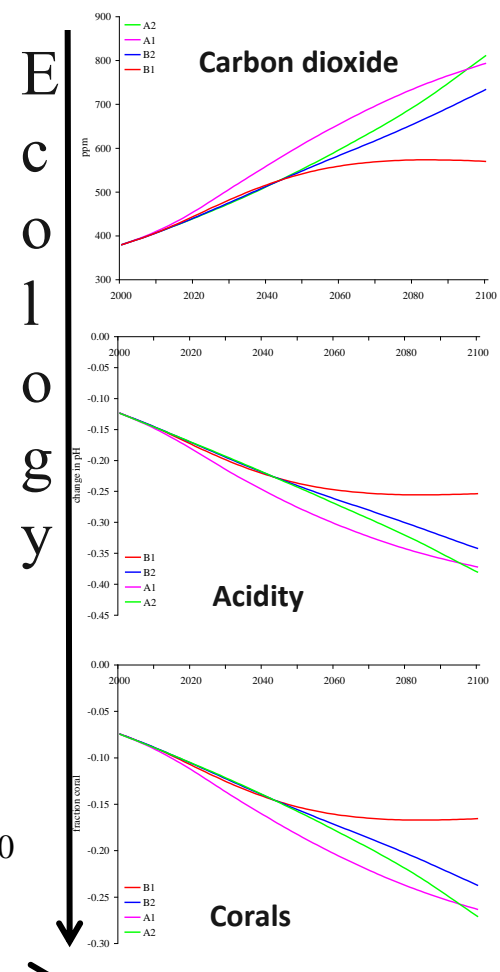
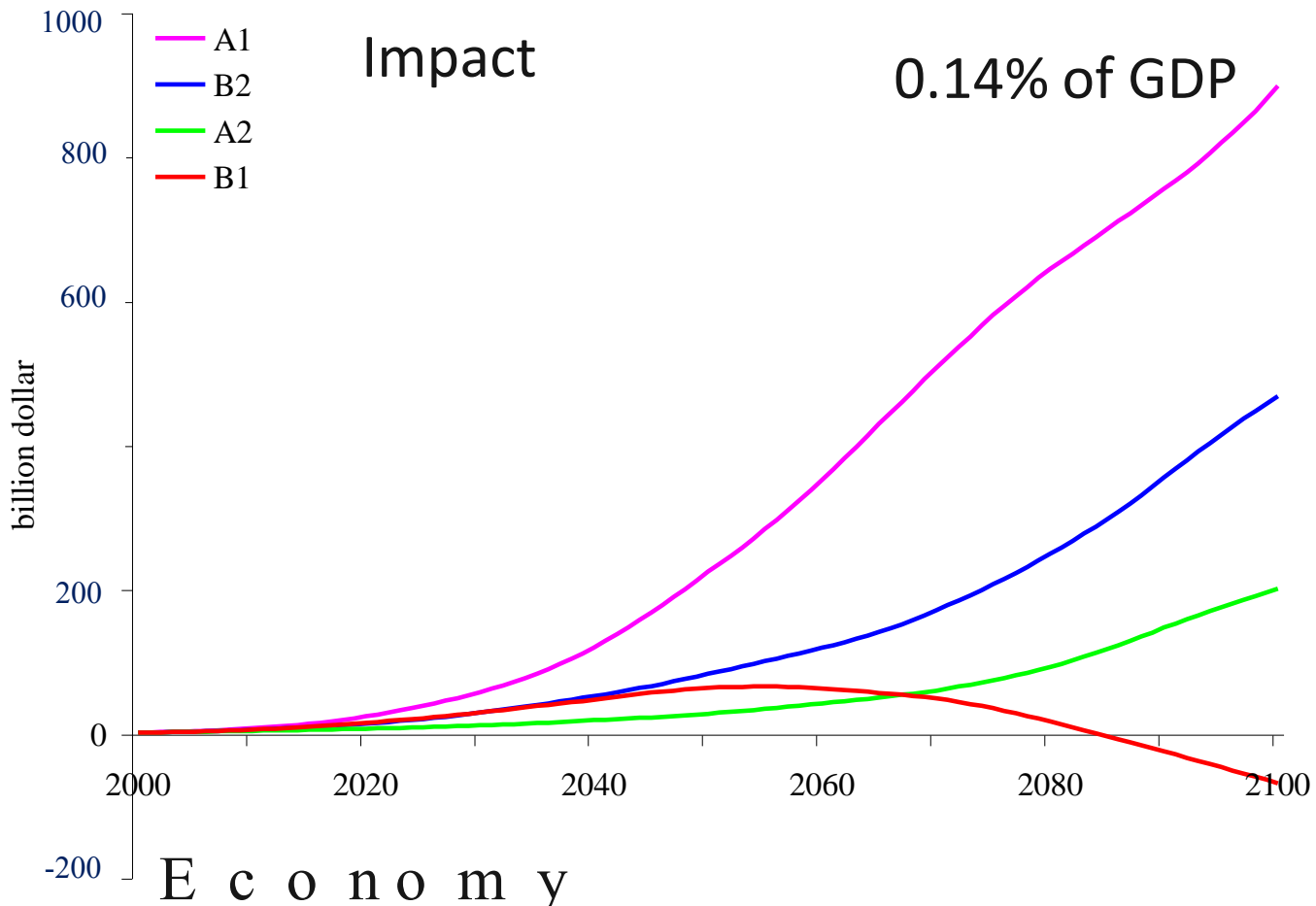
# Carbon dioxide





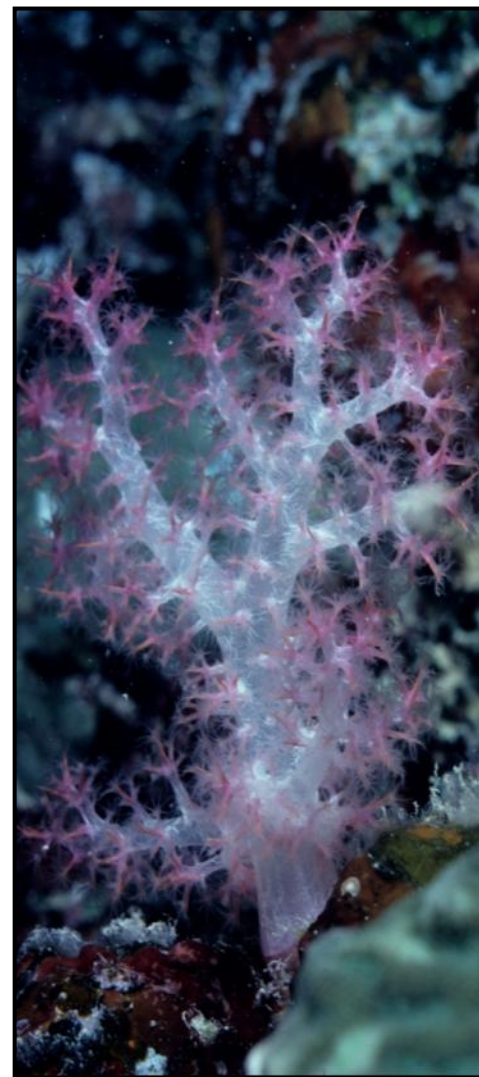






# Conclusions

- This is a **first attempt** to put a money value on OA impacts on coral reefs
- Provides an argument for both **mitigation** of CO<sub>2</sub> emissions and **adaptation** to likely impacts
- Impacts are likely to be **highly localised** depending on vulnerability (exposure + dependence + adaptive capacity)
- Need for research at **local scales**





Thank You

