- **In what ways do you use ACCESS?** (1)
  - Assessment of carbon cycle feedbacks, impact of nutrients on land carbon uptake
  - Assessment of carbon and climate reversibility
  - Assessment of future land carbon uptake
  - Participation in CMIP (DECK + 10 MIPs)
  - Paleoclimate modelling PMIP4 (last interglacial, mid Holocene, last millennium)

- **What research are you planning or would like to do that uses ACCESS?** (2)
  - Discover role of Australian biosphere in the transition to net-zero emissions
  - Deep time paleo modelling, glacial time paleo modelling
  - Sensitivity studies related to past climate (i.e. changes in topography, meltwater input, GHGs, orbital parameters)
  - Crop management and irrigation
  - Ecophysiological modelling
  - Interaction between climate and vegetation types (feedbacks to climate, afforestation, land management)
  - Analysis of extremes (i.e. bushfire weather)

- **What are barriers to using ACCESS for you?** (3)
  - Atmosphere too slow and too expensive
  - Model is still a black box
  - Availability of resources (SU on NCI, including storage options)

- **What would make ACCESS easier to use?** (4)
  - More flexibility and increased speed
  - Asynchronous coupling to atmosphere and ocean sea-ice and carbon cycle component
  - Simpler atmospheric component (or lower resolution and/or turning off processes); current UM7.3 component sufficient
  - Lower resolution for very long runs and large ensembles (i.e. enable ~100 simulation years per day)
  - Higher resolution (for at least ocean) for paleo-modelling and (atmosphere and land) for ecophysiolocical modelling
  - Better documentation
  - Postprocessing option of raw ACCESS output (to be meaningful), pre-processing option of ACCESS input

- **Specific features/components/applications for ACCESS-ESM:**
- Requirements for use in ecophysiological modelling:
  - Access to compute time
  - Resolution (processes of interest are at higher resolution), irrigation, vegetation feedbacks (i.e. fire)
  - Better documentation (input-output representation)
- Dynamic vegetation:
  - Competition and change in biomes/PFTs
  - CABLE-POP in ACCESS (age classes, growth and regrowth of woody vegetation)
  - Needs to be suitable and able to integrate in ACCESS-ESM
- Non-CO2 GHGs (CH4)
- Fire (Ecophysiological and paleo applications, Carbon balance)
- Crop model, irrigation
- Improved BGC ocean component (increase complexity)
- Improved land use change component
- Possibility to change topography and bathymetry

Managing Carbon / Earth System Modelling

	Idea	Short (< 1 year) Medium (1-2 yr) Long (2-5 yr)	NRI team
1	Maintaining and supporting payu framework for ACCESS-ESM	Short	Coupled
2	Provide multiple resolution configurations for ACCESS-ESM	Medium	Coupled
3	Provide training and help with troubleshooting, inquiries etc.	Short	User
4	Translation of land use types into CABLE PFT	Short	Land
5	Capability to perform offline ocean/sea-ice/carbon simulations	Short	ocean
6	Dynamic vegetation (i.e. CABLE-POP in ACCESS)	Medium	land
7	Ability to (easily) change topography and bathymetry	Medium	coupled

ESM

	Idea	Short (< 1 year) Medium (1-2 yr) Long (2-5 yr)	NRI team
1	Calculate orbital parameters instead of them being an input to allow transient simulations	short/medium	atmosphere
2	Improved ocean biogeochemistry (e.g. Si cycle)	short	ocean
3	Flexible outputs in terms of frequency and variables	Short	Coupled
4	Fire model component	medium	land
5	Crop and irrigation components	medium	land
6	Improved land use and land management component	medium	land
7			