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Climate Futures for Eastern Melbourne

Data provided for the Eastern Alliance for Greenhouse Action

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Climate Futures for Eastern Melbourne – 2030 A1B

Climate futures for 2030 using the A1B - medium emissions scenario

		Annual Surface Temperature (°C)			
		Slightly Warmer < 0.50	Warmer 0.50 to 1.50	Hotter 1.50 to 3.00	Much Hotter > 3.00
Annual Rainfall (%)	Much Drier < -15.00				
	Drier -15.00 to -5.00		Likelihood: 4 of 18 models (22%)		
	Little Change -5.00 to 5.00		Likelihood: 14 of 18 models (77%)		
	Wetter 5.00 to 15.00				
	Much Wetter > 15.00				

Climate Futures for the 5° grid centred on 37.5°S 146.5°E

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Climate Futures for Eastern Melbourne – the 2050s

Climate futures for 2055 using the B1 - low emissions scenario

		Annual Surface Temperature (°C)			
		Slightly Warmer < 0.50	Warmer 0.50 to 1.50	Hotter 1.50 to 3.00	Much Hotter > 3.00
Annual Rainfall (%)	Much Drier < -15.00				
	Drier -15.00 to -5.00		Likelihood: 10 of 18 models (55%)		
	Little Change -5.00 to 5.00		Likelihood: 8 of 18 models (44%)		
	Wetter 5.00 to 15.00				
	Much Wetter > 15.00				

Climate futures for 2055 using the A1Fi scenario

		Annual Surface Temperature (°C)			
		Slightly Warmer < 0.50	Warmer 0.50 to 1.50	Hotter 1.50 to 3.00	Much Hotter > 3.00
Annual Rainfall (%)	Much Drier < -15.00			Likelihood: 2 of 18 models (11%)	
	Drier -15.00 to -5.00		Likelihood: 3 of 18 models (16%)	Likelihood: 8 of 18 models (44%)	
	Little Change -5.00 to 5.00		Likelihood: 2 of 18 models (11%)	Likelihood: 3 of 18 models (16%)	
	Wetter 5.00 to 15.00				
	Much Wetter > 15.00				

Climate Futures for the 5° grid centred on 37.5°S 146.5°E

Climate Futures for Eastern Melbourne – the 2070s

Climate futures for 2070 using the B1 - low emissions scenario

		Annual Surface Temperature (°C)			
		Slightly Warmer < 0.50	Warmer 0.50 to 1.50	Hotter 1.50 to 3.00	Much Hotter > 3.00
Annual Rainfall (%)	Much Drier < -15.00				
	Drier -15.00 to -5.00		Likelihood: 8 of 18 models (44%)	Likelihood: 2 of 18 models (11%)	
	Little Change -5.00 to 5.00		Likelihood: 6 of 18 models (33%)	Likelihood: 2 of 18 models (11%)	
	Wetter 5.00 to 15.00				
	Much Wetter > 15.00				

Climate futures for 2070 using the A1Fi scenario

		Annual Surface Temperature (°C)			
		Slightly Warmer < 0.50	Warmer 0.50 to 1.50	Hotter 1.50 to 3.00	Much Hotter > 3.00
Annual Rainfall (%)	Much Drier < -15.00			Likelihood: 4 of 18 models (22%)	Likelihood: 2 of 18 models (11%)
	Drier -15.00 to -5.00			Likelihood: 5 of 18 models (27%)	Likelihood: 1 of 18 models (5%)
	Little Change -5.00 to 5.00			Likelihood: 4 of 18 models (22%)	Likelihood: 2 of 18 models (11%)
	Wetter 5.00 to 15.00				
	Much Wetter > 15.00				

Climate Futures for the 5° grid centred on 37.5°S 146.5°E

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Climate Futures for Eastern Melbourne
As described by annual temperature and rainfall Analysis

Information for the selected Climate Futures is presented for each time period and emissions scenario. Only the highest priority variables are described.

2030 A1B   **Most likely climate future: Warmer – Little Rainfall Change (14 of 18 models)**

   Annual surface temperature: increase of 0.6 to 1.0°C

   Summer (DJF) maximum temperature: increase of 0.2 to 0.5°C

   Winter (JJA) minimum temperature: increase of 0.2 to 0.3°C

   Annual mean rainfall: -4.9 to +1.3%

   Change in windspeed: -3.8 to +6.0%

   Suggested worst case climate future: Warmer – Drier (4 of 18 models)

   Annual surface temperature: increase of 0.7 to 1.1°C

   Summer (DJF) maximum temperature: increase of 0.3°C to 0.4°C

   Winter (JJA) minimum temperature: increase of 0.2 to 0.3°C

   Annual mean rainfall: -7.5 to -5.1%

   Change in windspeed: -1.7 to 6.8%

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Climate Futures for Eastern Melbourne
As described by annual temperature and rainfall
Analysis

2055 B1 **Most likely climate future: Warmer – Drier (10 of 18 models)**

Annual surface temperature: increase of 0.8 to 1.5°C

Summer (DJF) maximum temperature: increase of 0.3 to 0.4°C

Winter (JJA) minimum temperature: increase of 0.2 to 0.3°C

Annual mean rainfall: -10.1 to -5.1%

Change in windspeed: -2.9 to 9.2%

In this instance the most likely climate future is also the suggested worst case climate future.

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Climate Futures for Eastern Melbourne
As described by annual temperature and rainfall Analysis

2055 A1FI   **Most likely climate future: Hotter – Drier (8 of 18 models)**

Annual surface temperature: increase of 1.7 to 2.5°C

Summer (DJF) maximum temperature: increase of 1.1°C (data available from one model only)

Winter (JJA) minimum temperature: increase of 0.7°C (data available from one model only)

Annual mean rainfall: -6.2 to -14.0%

Windspeed: -8.8 to 15.5%

Suggested worst case climate future: Hotter – Much Drier (2 of 18 models)

Annual surface temperature: increase of 1.6 to 2.5°C

Summer (DJF) maximum temperature: increase of 0.7 to 0.9°C

Winter (JJA) minimum temperature: increase of 0.4 to 0.7°C

Annual mean rainfall: -17.2 to -17.5%

Windspeed: -4.0%

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Climate Futures for Eastern Melbourne
As described by annual temperature and rainfall Analysis

2070 B1

Most likely climate future: Warmer – Drier (8 of 18 models)

Annual surface temperature: increase of 0.9 to 1.4°C

Summer (DJF) maximum temperature: increase of 0.5°C (data available from one model only)

Winter (JJA) minimum temperature: increase of 0.3°C (data available from one model only)

Annual mean rainfall: -6.2 to -12.1%

Windspeed: -3.5 to 11.3%

Suggested worst case climate future: Hotter – Drier (2 of 18 models)

Annual surface temperature: increase of 1.8°C

Summer (DJF) maximum temperature: increase of 0.7°C (data available from one model only)

Winter (JJA) minimum temperature: increase of 0.5°C (data available from one model only)

Annual mean rainfall: -9.9 to -12.4%

Slight reduction in windspeed: -2.8%

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2070 A1FI In this instance there is no most likely climate future as there is no group of models with a total percentage greater than 27%. For the models to be grouped under most likely, it is necessary for there to be a percentage of 33% or more.

Suggested worst case climate future: Much Hotter – Much Drier (2 of 18 models)

Note that this is a sub-set of the Most Likely Climate Future

Annual surface temperature: increase of 3.5°C

Summer (DJF) maximum temperature: increase of 1.3°C (data available from one model only)

Winter (JJA) minimum temperature: increase of 0.9°C (data available from one model only)

Annual mean rainfall: -19.4 to -24.1%

Windspeed: -5.5%

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Data Explanation and Acknowledgements

Data are presented using the CSIRO's Climate Futures method as described in Whetton *et al*. (2010)

Climate Futures were derived from 24 global climate models; models identified by Smith & Chandler (2010) and Irving et al. (2011) as performing poorly were subsequently excluded from the analysis.

Values provided are annual changes relative to a 30 year period centred on 1990 (1975 – 2004)

Rainfall: Change in precipitation (%)
Surface Temperature: Change in temperature at 2 m above ground (°C)

References
Irving, D. B., S. E. Perkins, et al. (2011). "Evaluating global climate models for the Pacific island region." *Climate Research* **49**(3): 169-187.

Smith I, Chandler E (2010) 'Refining rainfall projections for the Murray Darling Basin of south-east Australia—the effect of sampling model results based on performance.' *Climatic Change*. DOI 10.1007/s10584-009-9757-1.

Whetton PH, Hennessy KJ, Bates B, Kent D (2010) Regional projections and model evaluation: benefits of 'representative future regional climates' In 'Proceedings of the IPCC Model Evaluation Workshop'. Boulder, Colorado, USA. January 2010.

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