Appendix to Chapter 7

Probabilistic Projections and Wider Uncertainty

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Data Format

The probabilistic climate projections for Singapore are provided as netcdf files. An example of the header information is shown below.

dimensions:
time = UNLIMITED ; // (137 currently)
dim1 = 9 ;
index = 101 ;
bnds = 2 ;
string13 = 13 ;
probability = 99 ;
variables:
double values_used_to_define_cdfs_and_pdfs(time, dim1, index) ;
values_used_to_define_cdfs_and_pdfs:long_name = "Values used to define CDFs and PDFs" ;
values_used_to_define_cdfs_and_pdfs:coordinates = "location" ;
double time(time) ;
time:axis = "T" ;
time:bounds = "time_bnds" ;
time:units = "days since 1859-12-01" ;
time:standard_name = "time" ;
time:long_name = "time" ;
time:calendar = "360_day" ;
double time_bnds(time, bnds) ;
int64 index(index) ;
index:units = "1" ;
index:long_name = "Index" ;
char location(dim1, string13) ;
location:units = "1" ;
location:long_name = "Location" ;
double cdfs(time, dim1, index) ;
cdfs:long_name = "CDFs" ;
cdfs:coordinates = "location" ;
double pdfs(time, dim1, index) ;
pdfs:long_name = "PDFs" ;
pdfs:coordinates = "location" ;
double percentiles(time, dim1, probability) ;
percentiles:long_name = "Percentiles" ;
percentiles:Meaning\ period = "Jun" ;
percentiles:Name = "Jun tas" ;
percentiles:Variable = "tas" ;
percentiles:coordinates = "location" ;
double probability(probability) ;
probability:units = "1" ;
probability:long_name = "probability" ;

The basic information is stored in the variables cdfs and values_used_to_define_cdfs_and_pdfs which for each of l=1,...,9 12km grid boxes (labelled “location”) and t=1,...,240 time points, there are i=1,...,101 values (dimensioned by “index”). The variable cdfs[t,l,i] stores the probability of climate change being below

values_used_to_define_cdfs_and_pdfs[t,l,i]. The information can also be used to estimate the probability of climate change being above or below some user-defined threshold using linear interpolation.It has been used to calculate the following quantities:

- percentiles[t,l,p] is the (100p)-th percentile at location l, and time t for probability, which takes values p=0.01,...,0.99.
- The probability density, pdfs[t,l,*i]* at *values_used_to_define_cdfs_and_pdfs[t,l,i].*

For each netcdf file storing probabilistic data, there is a corresponding file which stores 2500 sampled realisations consistent with the cdfs. The sampled data for the sampled realisation s, time point t, and location l, is stored in sampled_data[s,t,l].