2019年5月5日

Regional Climate Downscaling by Artificial Neural Network

Data:

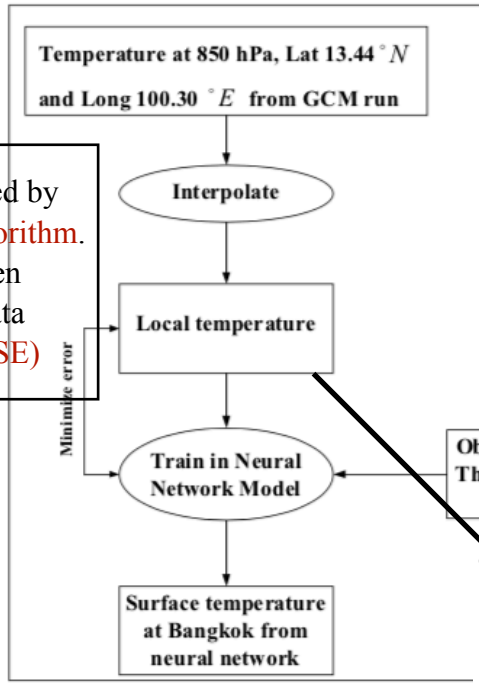
Table 1 The experiment setting.

GCM grid points	lat: $12^{\circ}N$ to $14^{\circ}N$, lon: $99^{\circ}E$ to $101^{\circ}E$
Point of interest	Bangkok at 13° lat and 100° long.
NCEP data (at 0000UTC, 850hPa)	1. 1 January to 31 December, 2001 to 2003.
	2. 1 January to 31 December, 2001 to 2005.
	3. 1 March to 31 May, 2001 to 2003.
	4. 1 March to 31 May ,2001 to 2005.
Downscale grid size	Interpolate 1° lat × 1° long to 0.1°lat × 0.1° long.

Seventy percent the data are used for training, 15% for test and another 15% for validation in neural network model.

Methods:

The weight-update are adjusted by the Levenberg-Marquardt algorithm. the error are compared between model output and observed data using the sum square error (SSE)



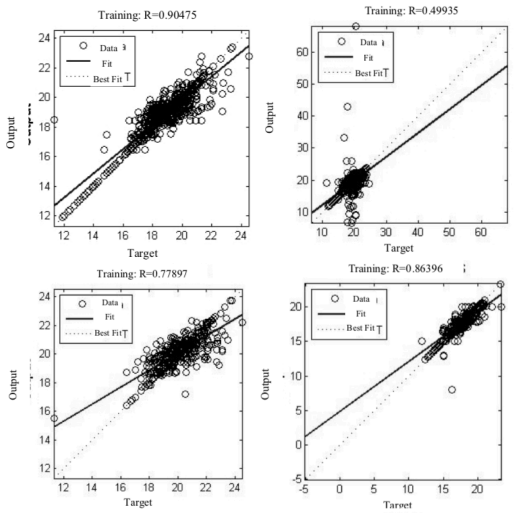
The rainy season is not used as study case because temperature in this season is contained by local effects that are not included in the global

Figure 2 Downscaling ste

Table 2 The number of data to the feedforward neural network model

Provinces	Case	Period	Number of data	
			Input layer	Hidden layer
Bangkok	1	January 2001 – December 2003	894	447
	2	January 2001 – December 2005	1413	706
	3	Summer of 2001 – 2005 (March-June)	528	264
	4	Winter of 2001 – 2005 (October-Febuary)	414	207

Results:



conclusions:

1. 对比case1和2，可以看出使用3年数据进行训练比使用5年数据进行训练得到的输出数据和观测数据的相似度更加接近；
2. 对比case2和3/4，使用5个全年数据进行训练的效果要比仅使用五年夏季数据/仅使用5年冬季数据的训练效果差；

这可能是由于全年数据包含了温度具有低精度的雨季。因此，结果表明季节影响模型的性能。