

Supplementary Information for

Interception reduction from deforestation and forest fire increases
large-scale fluvial flooding risk

Tae-Ho Kang, Ashish Sharma, Lucy Marshall, Young-Oh Kim

Correspondence to: a.sharma@unsw.edu.au (A.S.)

This file includes:

1. Catchment properties for Hydrological Reference Stations
2. Rainfall anomaly for the reference and treatment groups

1. Catchment properties for Hydrological Reference Stations

The catchments for the 21 Hydrological Reference Stations (HRS) used in this study represents diverse properties. The stations with catchment size larger than 100 km² were selected and the largest catchment size is 1,247 km², and correspondingly stream length is also as diverse as 21 km to 118 km. The annual average runoff (AAR) shows mild relation to the catchment size. The larger the catchment size is, the lower the AAR becomes. The AAR averaged for the catchments smaller than 400 km² is 394 mm, while the AAR of the catchments larger than 400 km² has the average 325 mm, 82% comparing to smaller watershed. The annual CV (Coefficient of Variation) does not show recognizable dependence to the catchment size, but the larger catchments have the slightly higher CV on average.

Table S-1. Catchment properties for 21 Hydrological Reference Stations

ID	Location	Area	Longest Stream Length	Max Elevation	Min Elevation	Annual Average Runoff	Annual CV
405205	145.564°E, 37.414°S	105.8 km ²	29 km	1010 m	318 m	455 mm	0.36
405209	145.714°E, 37.318°S	629.4 km ²	53 km	1451 m	207 m	446 mm	0.41
405219	146.130°E, 37.330°S	700.2 km ²	69 km	1570 m	298 m	468 mm	0.41
405218	146.188°E, 37.291°S	364.2 km ²	62 km	1724 m	313 m	564 mm	0.39
405215	146.207°E, 37.230°S	374.0 km ²	55 km	1759 m	316 m	449 mm	0.44
403213	146.244°E, 36.620°S	230.9 km ²	42 km	1030 m	195 m	235 mm	0.7
405263	146.247°E, 37.463°S	328.9 km ²	36 km	1454 m	405 m	410 mm	0.39
225110A	146.319°E, 37.684°S	132.1 km ²	21 km	1320 m	461 m	323 mm	0.41
403217	146.583°E, 36.824°S	180.3 km ²	38 km	1554 m	314 m	335 mm	0.64
403222	146.701°E, 36.911°S	415.0 km ²	36 km	1579 m	340 m	381 mm	0.54
403232	146.979°E, 36.752°S	124.1 km ²	23 km	1253 m	325 m	358 mm	0.59
224206	147.089°E, 37.406°S	1100 km ²	81 km	1670 m	239 m	298 mm	0.6
224213	147.271°E, 37.494°S	669.7 km ²	107 km	1859 m	178 m	246 mm	0.44
224214	147.393°E, 37.495°S	438.9 km ²	61 km	1460 m	159 m	88 mm	0.78
401210	147.413°E, 36.568°S	415.7 km ²	40 km	1946 m	316 m	465 mm	0.51
401216	147.472°E, 36.932°S	356.8 km ²	45 km	1983 m	691 m	643 mm	0.39
401217	147.709°E, 36.756°S	389.8 km ²	48 km	1751 m	495 m	285 mm	0.54
401212	147.829°E, 36.446°S	251.6 km ²	46 km	1763 m	495 m	530 mm	0.49
401012	148.052°E, 36.319°S	1257 km ²	116 km	2182 m	316 m	367 mm	0.45
222206	148.175°E, 37.495°S	850.2 km ²	118 km	1801 m	77 m	165 mm	0.7
222213	148.327°E, 36.954°S	361.4 km ²	45 km	1828 m	375 m	143 mm	0.54

2. Rainfall anomaly for reference and treatment groups

Figure S-1 shows the average and maximum precipitation anomaly of the months from February to October for the state of Victoria in Australia. The anomaly is the difference from the mean, divided by the standard deviation. The details for the calculation of the anomaly are in the method section. The green dots represent the 50 reference years from 1953 to 2002, the orange colour filled boxes the treatment group with the forest fire years 2003, 2007, and 2009, and the green dots marked with orange box lines are the state-controlled reference group with the years selectively retrieved according to the similarity of the climate and rainfall states to the treatment group. The climate states are measured by the climate indices such as the Dipole Mode Index, Southern Oscillation Index, Southern Annual Mode, in addition to the rainfall anomaly states. As Figure S-1 shows, the years of the treatment group have similar rainfall states close to neutral and mild negative anomaly. The reference years within the range of the treatment years are selectively retrieved as the state-controlled reference years as the figure shows, but some of the reference years within the range are not selected because of its difference for the climate indices. The state-controlled reference group has the climate and precipitation states close to the treatment group of the forest fire years.

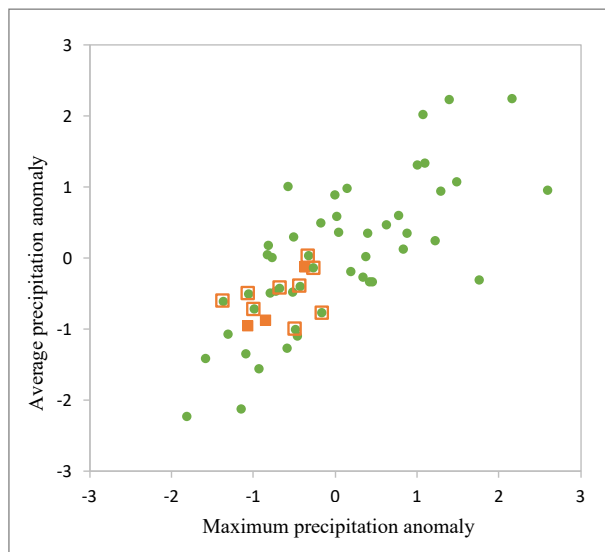


Fig. S-1. The average and maximum precipitation anomaly of the reference group (green dots), the state-controlled reference group (orange-coloured square lines), and the treatment group (orange colour filled squares).