**Table S5. Results from PCA on hydraulics and hydrology indices.**

**pca\_Hydro\_St.csv**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| KMO |  |  |  |  |  |  |  |  | Total |
|  |  |  |  |  |  |  |  |  |  |
|  | Q | QMEAN | Q50 | QCVANN | QPORR | QNERR | Vav | Vmax |  |
|  | 0.101 | 0.371 | 0.288 | 0.244 | 0.360 | 0.375 | 0.172 | 0.477 | 0.303 |

eig

|  |  |  |  |
| --- | --- | --- | --- |
|  | eigenvalue | percentage of variance | cumulative percentage of variance |
| comp 1 | 4.3727 | 54.6593 | 54.6593 |
| comp 2 | 2.394 | 29.925 | 84.5843 |
| comp 3 | 0.6399 | 7.9989 | 92.5832 |
| comp 4 | 0.3836 | 4.7949 | 97.378 |
| comp 5 | 0.1867 | 2.3333 | 99.7114 |
| comp 6 | 0.0158 | 0.1981 | 99.9095 |
| comp 7 | 0.0072 | 0.0903 | 99.9998 |
| comp 8 | 0 | 2e-04 | 100 |

var

coord

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dim.1 | Dim.2 | Dim.3 | Dim.4 | Dim.5 |
| Q | 0.3117 | 0.8003 | 0.0836 | 0.503 | -0.0442 |
| QMEAN | 0.9436 | -0.2807 | -0.156 | -0.046 | 0.0021 |
| Q50 | 0.7929 | -0.3219 | -0.4331 | 0.1481 | 0.2404 |
| QCVANN | 0.7495 | -0.0777 | 0.6246 | -0.0497 | 0.1988 |
| QPORR | 0.9415 | -0.1959 | -0.001 | -0.0335 | -0.2722 |
| QNERR | 0.9512 | -0.2664 | 0.0949 | 0.034 | -0.102 |
| Vav | 0.4547 | 0.8624 | -0.1201 | -0.1558 | 0.0533 |
| Vmax | 0.4438 | 0.8439 | -0.0863 | -0.2783 | 0.0028 |

cor

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dim.1 | Dim.2 | Dim.3 | Dim.4 | Dim.5 |
| Q | 0.3117 | 0.8003 | 0.0836 | 0.503 | -0.0442 |
| QMEAN | 0.9436 | -0.2807 | -0.156 | -0.046 | 0.0021 |
| Q50 | 0.7929 | -0.3219 | -0.4331 | 0.1481 | 0.2404 |
| QCVANN | 0.7495 | -0.0777 | 0.6246 | -0.0497 | 0.1988 |
| QPORR | 0.9415 | -0.1959 | -0.001 | -0.0335 | -0.2722 |
| QNERR | 0.9512 | -0.2664 | 0.0949 | 0.034 | -0.102 |
| Vav | 0.4547 | 0.8624 | -0.1201 | -0.1558 | 0.0533 |
| Vmax | 0.4438 | 0.8439 | -0.0863 | -0.2783 | 0.0028 |

cos2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dim.1 | Dim.2 | Dim.3 | Dim.4 | Dim.5 |
| Q | 0.0972 | 0.6405 | 0.007 | 0.2531 | 0.002 |
| QMEAN | 0.8903 | 0.0788 | 0.0244 | 0.0021 | 0 |
| Q50 | 0.6286 | 0.1036 | 0.1876 | 0.0219 | 0.0578 |
| QCVANN | 0.5618 | 0.006 | 0.3901 | 0.0025 | 0.0395 |
| QPORR | 0.8863 | 0.0384 | 0 | 0.0011 | 0.0741 |
| QNERR | 0.9048 | 0.071 | 0.009 | 0.0012 | 0.0104 |
| Vav | 0.2067 | 0.7437 | 0.0144 | 0.0243 | 0.0028 |
| Vmax | 0.1969 | 0.7121 | 0.0075 | 0.0774 | 0 |

contrib

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dim.1 | Dim.2 | Dim.3 | Dim.4 | Dim.5 |
| Q | 2.2221 | 26.7523 | 1.0911 | 65.9706 | 1.045 |
| QMEAN | 20.3601 | 3.2909 | 3.8053 | 0.5521 | 0.0024 |
| Q50 | 14.3765 | 4.3272 | 29.3116 | 5.7196 | 30.9671 |
| QCVANN | 12.8473 | 0.2521 | 60.9631 | 0.645 | 21.1818 |
| QPORR | 20.2694 | 1.603 | 2e-04 | 0.2933 | 39.7059 |
| QNERR | 20.6926 | 2.9638 | 1.4088 | 0.3019 | 5.574 |
| Vav | 4.728 | 31.0638 | 2.2556 | 6.3267 | 1.5197 |
| Vmax | 4.5039 | 29.7469 | 1.1643 | 20.1907 | 0.0041 |

ind

coord

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dim.1 | Dim.2 | Dim.3 | Dim.4 | Dim.5 |
| GK1\_17 | 0.9251 | 1.6998 | 0.3813 | 1.0435 | -0.1527 |
| GK1\_18 | 3.8436 | -1.9854 | -0.1511 | 0.0814 | -0.1887 |
| GK1\_19\_6 | -0.5728 | -0.3511 | 0.4771 | -0.1202 | 0.7962 |
| GK1\_19\_10 | -1.9196 | -0.0449 | -1.429 | 0.0506 | -0.2398 |
| GK1\_20 | -1.8396 | -1.8146 | 0.1354 | 0.765 | 0.0991 |
| GK1\_21 | -1.516 | -0.3109 | 1.19 | -0.3174 | -0.6093 |
| GK2\_17 | 1.8101 | 3.9784 | -0.1602 | -0.3536 | 0.1432 |
| GK2\_18 | 4.1404 | -1.2238 | -0.3297 | -0.401 | -0.0982 |
| GK2\_19\_6 | -0.2761 | 0.4105 | 0.2985 | -0.6025 | 0.8867 |
| GK2\_19\_10 | -1.6228 | 0.7167 | -1.6076 | -0.4317 | -0.1493 |
| GK2\_20 | -1.6837 | -1.4142 | 0.0506 | 0.4641 | 0.1201 |
| GK2\_21 | -1.1903 | 0.5251 | 0.9967 | -0.8611 | -0.5179 |
| GK3\_17 | 1.2119 | 2.5394 | 0.3314 | 1.416 | -0.1227 |
| GK3\_18 | 4.0161 | -1.5426 | -0.2527 | -0.2109 | -0.1428 |
| GK3\_19\_6 | -0.4003 | 0.0917 | 0.3755 | -0.4125 | 0.8422 |
| GK3\_19\_10 | -1.7471 | 0.3979 | -1.5306 | -0.2417 | -0.1939 |
| GK3\_20 | -1.8548 | -1.8535 | 0.1459 | 0.7826 | 0.0905 |
| GK3\_21 | -1.3242 | 0.1815 | 1.0786 | -0.6506 | -0.5627 |

cos2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dim.1 | Dim.2 | Dim.3 | Dim.4 | Dim.5 |
| GK1\_17 | 0.1666 | 0.5626 | 0.0283 | 0.212 | 0.0045 |
| GK1\_18 | 0.7865 | 0.2099 | 0.0012 | 4e-04 | 0.0019 |
| GK1\_19\_6 | 0.2443 | 0.0918 | 0.1695 | 0.0108 | 0.472 |
| GK1\_19\_10 | 0.6353 | 3e-04 | 0.3521 | 4e-04 | 0.0099 |
| GK1\_20 | 0.4617 | 0.4492 | 0.0025 | 0.0798 | 0.0013 |
| GK1\_21 | 0.5355 | 0.0225 | 0.33 | 0.0235 | 0.0865 |
| GK2\_17 | 0.1694 | 0.8183 | 0.0013 | 0.0065 | 0.0011 |
| GK2\_18 | 0.9058 | 0.0791 | 0.0057 | 0.0085 | 5e-04 |
| GK2\_19\_6 | 0.0513 | 0.1135 | 0.06 | 0.2446 | 0.5296 |
| GK2\_19\_10 | 0.4432 | 0.0864 | 0.435 | 0.0314 | 0.0038 |
| GK2\_20 | 0.5549 | 0.3915 | 5e-04 | 0.0422 | 0.0028 |
| GK2\_21 | 0.3832 | 0.0746 | 0.2687 | 0.2006 | 0.0725 |
| GK3\_17 | 0.1456 | 0.6392 | 0.0109 | 0.1987 | 0.0015 |
| GK3\_18 | 0.8653 | 0.1277 | 0.0034 | 0.0024 | 0.0011 |
| GK3\_19\_6 | 0.1336 | 0.007 | 0.1176 | 0.1419 | 0.5915 |
| GK3\_19\_10 | 0.5396 | 0.028 | 0.4142 | 0.0103 | 0.0066 |
| GK3\_20 | 0.4562 | 0.4555 | 0.0028 | 0.0812 | 0.0011 |
| GK3\_21 | 0.4748 | 0.0089 | 0.3151 | 0.1146 | 0.0857 |

contrib

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Dim.1 | Dim.2 | Dim.3 | Dim.4 | Dim.5 |
| GK1\_17 | 1.0873 | 6.7053 | 1.2623 | 15.7714 | 0.6937 |
| GK1\_18 | 18.7695 | 9.1476 | 0.1983 | 0.0959 | 1.0602 |
| GK1\_19\_6 | 0.4168 | 0.286 | 1.976 | 0.2092 | 18.8682 |
| GK1\_19\_10 | 4.6814 | 0.0047 | 17.7292 | 0.0371 | 1.712 |
| GK1\_20 | 4.2996 | 7.641 | 0.1591 | 8.4759 | 0.2922 |
| GK1\_21 | 2.9199 | 0.2243 | 12.2944 | 1.4592 | 11.0481 |
| GK2\_17 | 4.1629 | 36.729 | 0.2229 | 1.8113 | 0.6103 |
| GK2\_18 | 21.7795 | 3.4758 | 0.9438 | 2.3288 | 0.2872 |
| GK2\_19\_6 | 0.0968 | 0.391 | 0.7737 | 5.2583 | 23.4014 |
| GK2\_19\_10 | 3.3459 | 1.1919 | 22.4368 | 2.6995 | 0.6637 |
| GK2\_20 | 3.6018 | 4.6408 | 0.0222 | 3.1198 | 0.4294 |
| GK2\_21 | 1.8001 | 0.6399 | 8.6249 | 10.7389 | 7.9826 |
| GK3\_17 | 1.8661 | 14.9645 | 0.9537 | 29.0408 | 0.4482 |
| GK3\_18 | 20.4921 | 5.5222 | 0.5544 | 0.6443 | 0.6066 |
| GK3\_19\_6 | 0.2036 | 0.0195 | 1.2243 | 2.4641 | 21.1103 |
| GK3\_19\_10 | 3.8778 | 0.3674 | 20.3386 | 0.8458 | 1.1185 |
| GK3\_20 | 4.3709 | 7.9725 | 0.1847 | 8.8698 | 0.2437 |
| GK3\_21 | 2.2278 | 0.0765 | 10.1009 | 6.1299 | 9.4239 |

dist

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2.266212 | 4.333982 | 1.158918 | 2.408321 | 2.70738 | 2.071577 | 4.397829 | 4.350272 | 1.218425 | 2.437515 | 2.260247 | 1.92278 | 3.176326 | 4.317354 | 1.095095 | 2.378266 | 2.74627 | 1.921683 |

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svd

vs

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2.09111 | 1.547257 | 0.7999432 | 0.619345 | 0.43205 | 0.1258954 | 0.08501196 | 0.003859466 |

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| --- | --- | --- | --- | --- | --- | --- |
|  | 0.4424 | 1.0986 | 0.4767 | 1.6849 | -0.3534 |  |
|  | 1.8381 | -1.2832 | -0.1889 | 0.1314 | -0.4369 |  |
|  | -0.2739 | -0.2269 | 0.5964 | -0.1941 | 1.8429 |  |
|  | -0.918 | -0.029 | -1.7864 | 0.0817 | -0.5551 |  |
|  | -0.8797 | -1.1728 | 0.1692 | 1.2352 | 0.2294 |  |
|  | -0.725 | -0.2009 | 1.4876 | -0.5125 | -1.4102 |  |
|  | 0.8656 | 2.5712 | -0.2003 | -0.571 | 0.3314 |  |
|  | 1.98 | -0.791 | -0.4122 | -0.6475 | -0.2274 |  |
|  | -0.132 | 0.2653 | 0.3732 | -0.9729 | 2.0524 |  |
|  | -0.7761 | 0.4632 | -2.0096 | -0.6971 | -0.3456 |  |
|  | -0.8052 | -0.914 | 0.0632 | 0.7494 | 0.278 |  |
|  | -0.5692 | 0.3394 | 1.246 | -1.3903 | -1.1987 |  |
|  | 0.5796 | 1.6412 | 0.4143 | 2.2863 | -0.284 |  |
|  | 1.9206 | -0.997 | -0.3159 | -0.3406 | -0.3304 |  |
|  | -0.1914 | 0.0593 | 0.4694 | -0.666 | 1.9493 |  |
|  | -0.8355 | 0.2572 | -1.9134 | -0.3902 | -0.4487 |  |
|  | -0.887 | -1.1979 | 0.1823 | 1.2635 | 0.2094 |  |
|  | -0.6332 | 0.1173 | 1.3484 | -1.0504 | -1.3024 |  |

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V

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0.1491 | 0.5172 | 0.1045 | 0.8122 | -0.1022 |  |
|  | 0.4512 | -0.1814 | -0.1951 | -0.0743 | 0.0049 |  |
|  | 0.3792 | -0.208 | -0.5414 | 0.2392 | 0.5565 |  |
|  | 0.3584 | -0.0502 | 0.7808 | -0.0803 | 0.4602 |  |
|  | 0.4502 | -0.1266 | -0.0013 | -0.0542 | -0.6301 |  |
|  | 0.4549 | -0.1722 | 0.1187 | 0.0549 | -0.2361 |  |
|  | 0.2174 | 0.5573 | -0.1502 | -0.2515 | 0.1233 |  |
|  | 0.2122 | 0.5454 | -0.1079 | -0.4493 | 0.0064 |  |

> res.desc\_Hyd\_St

$Dim.1

Link between the variable and the continuous variables (R-square)

=================================================================================

correlation p.value

QNERR 0.9512275 1.380922e-09

QMEAN 0.9435553 4.336743e-09

QPORR 0.9414509 5.773305e-09

Q50 0.7928735 8.686398e-05

QCVANN 0.7495193 3.424378e-04

Vav 0.4546902 5.798780e-02

Vmax 0.4437815 6.506405e-02

Q 0.3117175 2.079496e-01

$Dim.2

Link between the variable and the continuous variables (R-square)

=================================================================================

correlation p.value

Vav 0.8623620 4.167154e-06

Vmax 0.8438852 1.073818e-05

Q 0.8002818 6.655893e-05

QCVANN -0.0776866 7.593021e-01

QPORR -0.1958963 4.359534e-01

QNERR -0.2663720 2.853204e-01

QMEAN -0.2806852 2.592261e-01

Q50 -0.3218586 1.927506e-01

> Cam4ia\_Hydro\_St

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Q | QMEAN | Q50 | QCVANN | QPORR | QNERR | Vav | Vmax |
| GK1\_17 | 0.78276611 | 0.26654266 | 0.4555149 | 0.7259741 | 0.3333333 | 0.4 | 0.47619048 | 0.5959596 |
| GK1\_18 | 0.07313541 | 1.00000000 | 1.0000000 | 1.0000000 | 1.0000000 | 1.0 | 0.28571429 | 0.3434343 |
| GK1\_19\_6 | 0.07313541 | 0.20265890 | 0.4583950 | 0.7799178 | 0.0000000 | 0.2 | 0.28571429 | 0.3434343 |
| GK1\_19\_10 | 0.07313541 | 0.09296755 | 0.4367557 | 0.0000000 | 0.0000000 | 0.0 | 0.28571429 | 0.3434343 |
| GK1\_20 | 0.00000000 | 0.04213572 | 0.4190083 | 0.4464804 | 0.0000000 | 0.2 | 0.01587302 | 0.0000000 |
| GK1\_21 | 0.04996379 | 0.00000000 | 0.0000000 | 0.6481860 | 0.1666667 | 0.2 | 0.20634921 | 0.2929293 |
| GK2\_17 | 0.78276611 | 0.26466821 | 0.4555149 | 0.7259741 | 0.3333333 | 0.4 | 1.00000000 | 1.0000000 |
| GK2\_18 | 0.07313541 | 1.00000000 | 1.0000000 | 1.0000000 | 1.0000000 | 1.0 | 0.44444444 | 0.4949495 |
| GK2\_19\_6 | 0.07313541 | 0.20265890 | 0.4583950 | 0.7799178 | 0.0000000 | 0.2 | 0.44444444 | 0.4949495 |
| GK2\_19\_10 | 0.07313541 | 0.09296755 | 0.4367557 | 0.0000000 | 0.0000000 | 0.0 | 0.44444444 | 0.4949495 |
| GK2\_20 | 0.00000000 | 0.04213572 | 0.4190083 | 0.4464804 | 0.0000000 | 0.2 | 0.04761905 | 0.1313131 |
| GK2\_21 | 0.04996379 | 0.00000000 | 0.0000000 | 0.6481860 | 0.1666667 | 0.2 | 0.36507936 | 0.4747475 |
| GK3\_17 | 1.00000000 | 0.26466821 | 0.4555149 | 0.7259741 | 0.3333333 | 0.4 | 0.66666667 | 0.5959596 |
| GK3\_18 | 0.07313541 | 1.00000000 | 1.0000000 | 1.0000000 | 1.0000000 | 1.0 | 0.36507936 | 0.4444444 |
| GK3\_19\_6 | 0.07313541 | 0.20265890 | 0.4583950 | 0.7799178 | 0.0000000 | 0.2 | 0.36507936 | 0.4444444 |
| GK3\_19\_10 | 0.07313541 | 0.09296755 | 0.4367557 | 0.0000000 | 0.0000000 | 0.0 | 0.36507936 | 0.4444444 |
| GK3\_20 | 0.00000000 | 0.04213572 | 0.4190083 | 0.4464804 | 0.0000000 | 0.2 | 0.00000000 | 0.0000000 |
| GK3\_21 | 0.04996379 | 0.00000000 | 0.0000000 | 0.6481860 | 0.1666667 | 0.2 | 0.28571429 | 0.4141414 |