

Supplementary Material to the paper:

”Evaluation of TanDEM-X DEMs on selected Brazilian sites:
comparison with SRTM, ASTER GDEM and ALOS AW3D30“

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1. Satellite images of the selected study areas

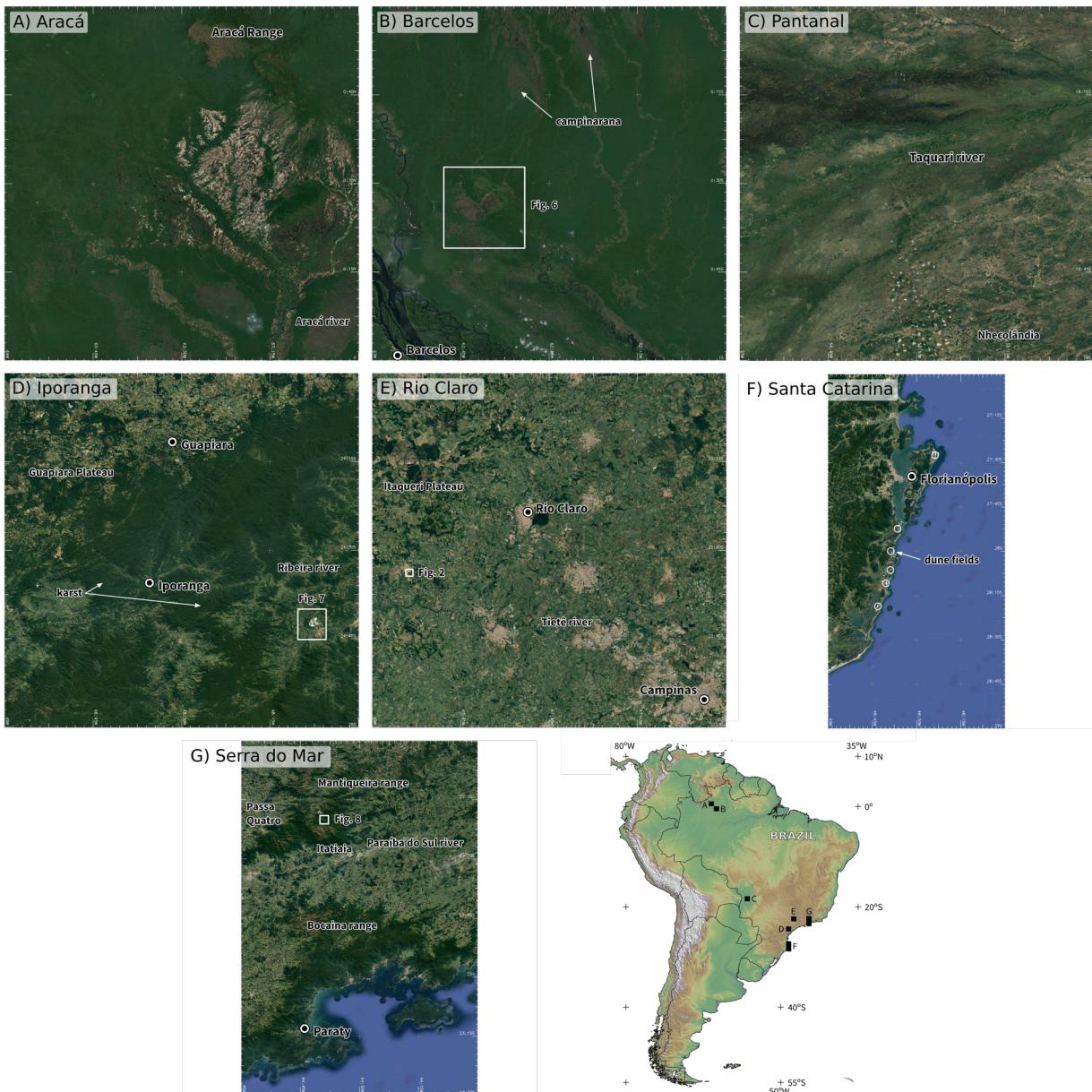


Figure S.1.1. Satellite imagery of studied areas with indication of places or landscape features referred in the text.
Satellite imagery ©2017 TerraMetrics, powered by Google.

2. Shaded relief images of the selected study areas

2.1. Aracá

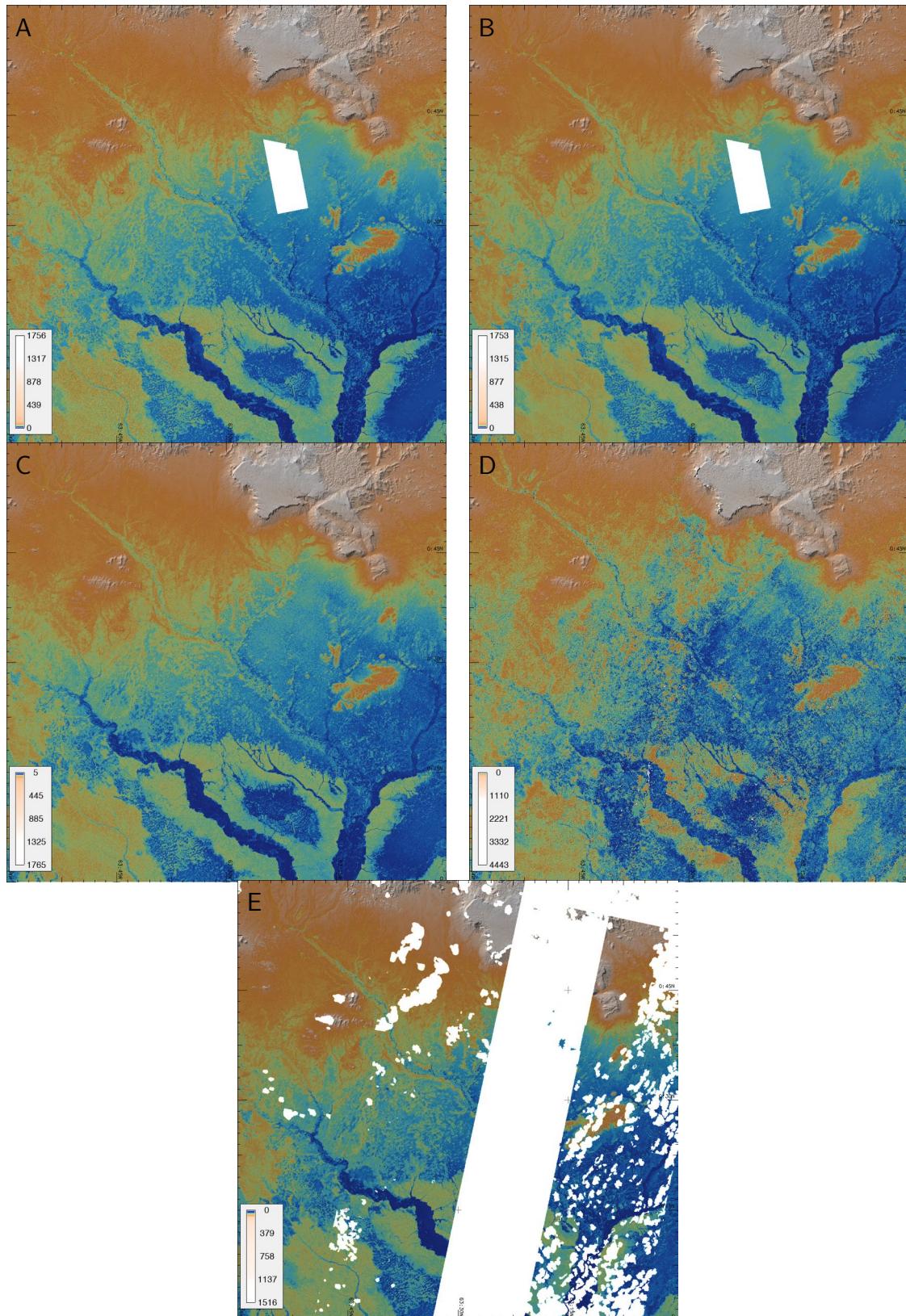


Figure S.2.1. Datasets for Aracá area. A) TanDEM-X, 12 m resolution; B) TanDEM-X, 30 m resolution; C) SRTM, 30 m resolution; D) ASTER GDEM, 30 m resolution; E) ALOS AW3D, 30 m resolution.

2.2. Barcelos

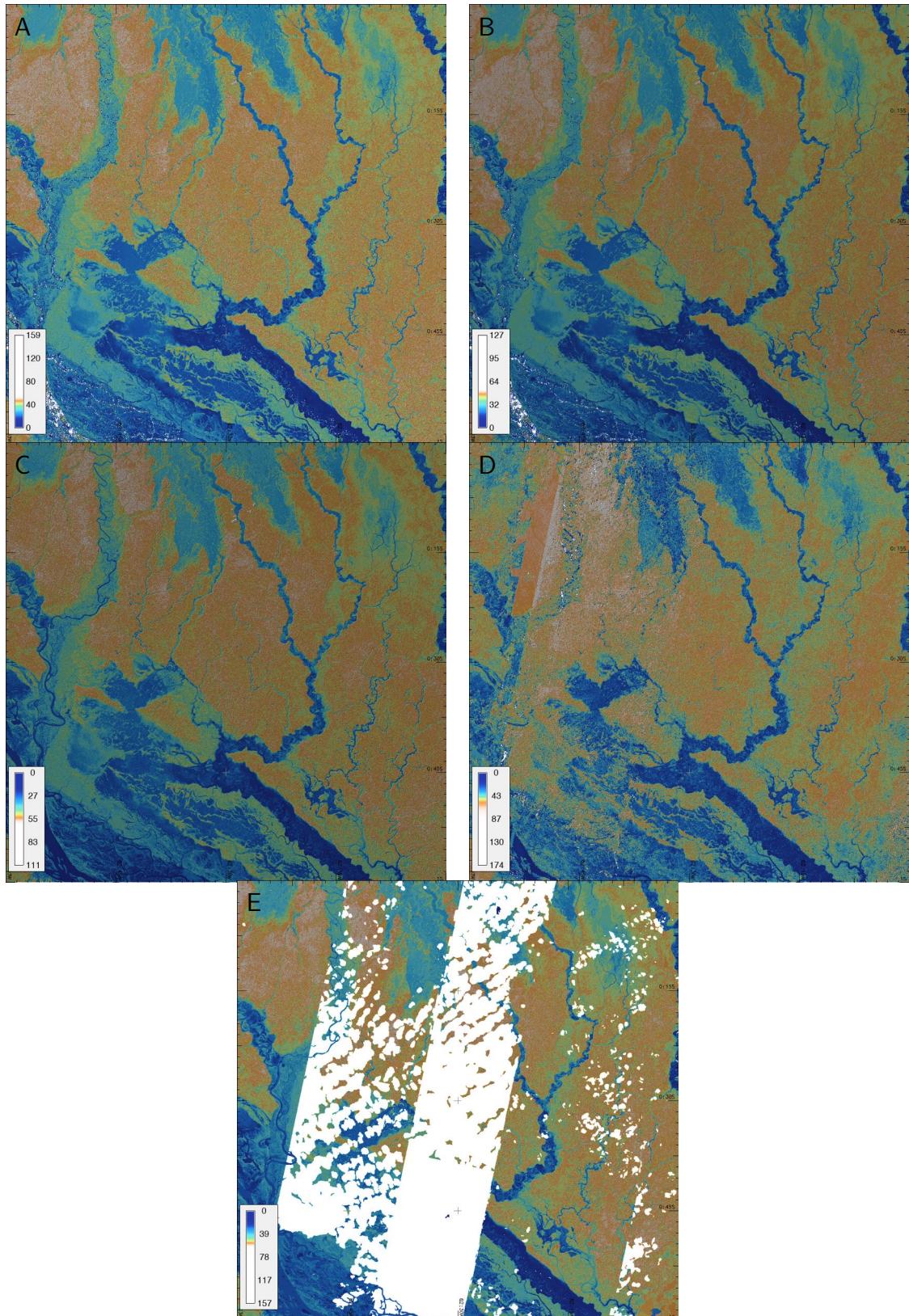


Figure S.2.2. Datasets for Barcelos area. A) TanDEM-X, 12 m resolution; B) TanDEM-X, 30 m resolution; C) SRTM, 30 m resolution; D) ASTER GDEM, 30 m resolution; E) ALOS AW3D, 30 m resolution.

2.3. Pantanal

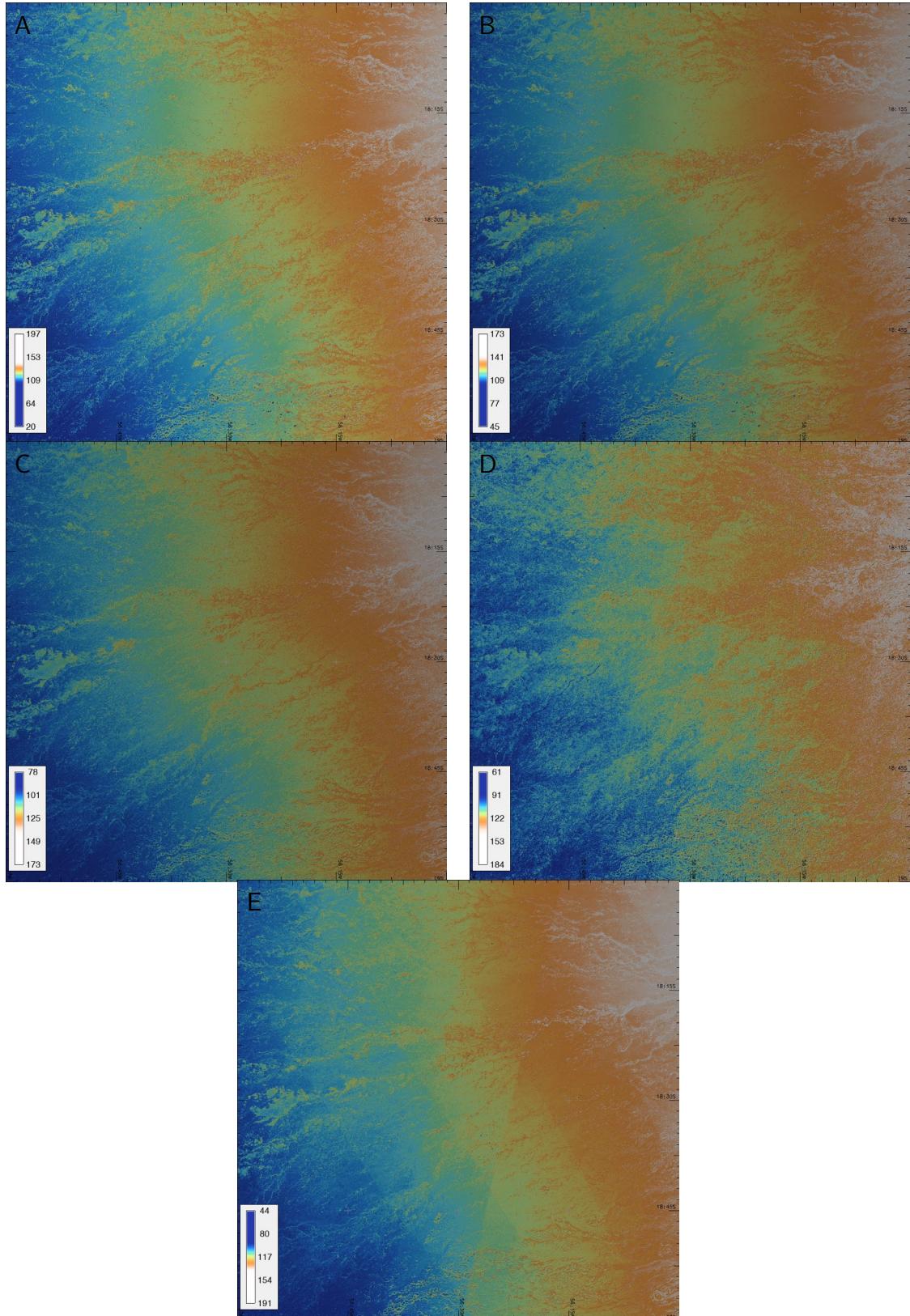


Figure S.2.3. Datasets for Pantanal area. A) TanDEM-X, 12 m resolution; B) TanDEM-X, 30 m resolution; C) SRTM, 30 m resolution; D) ASTER GDEM, 30 m resolution; E) ALOS AW3D, 30 m resolution.

2.4. Iporanga

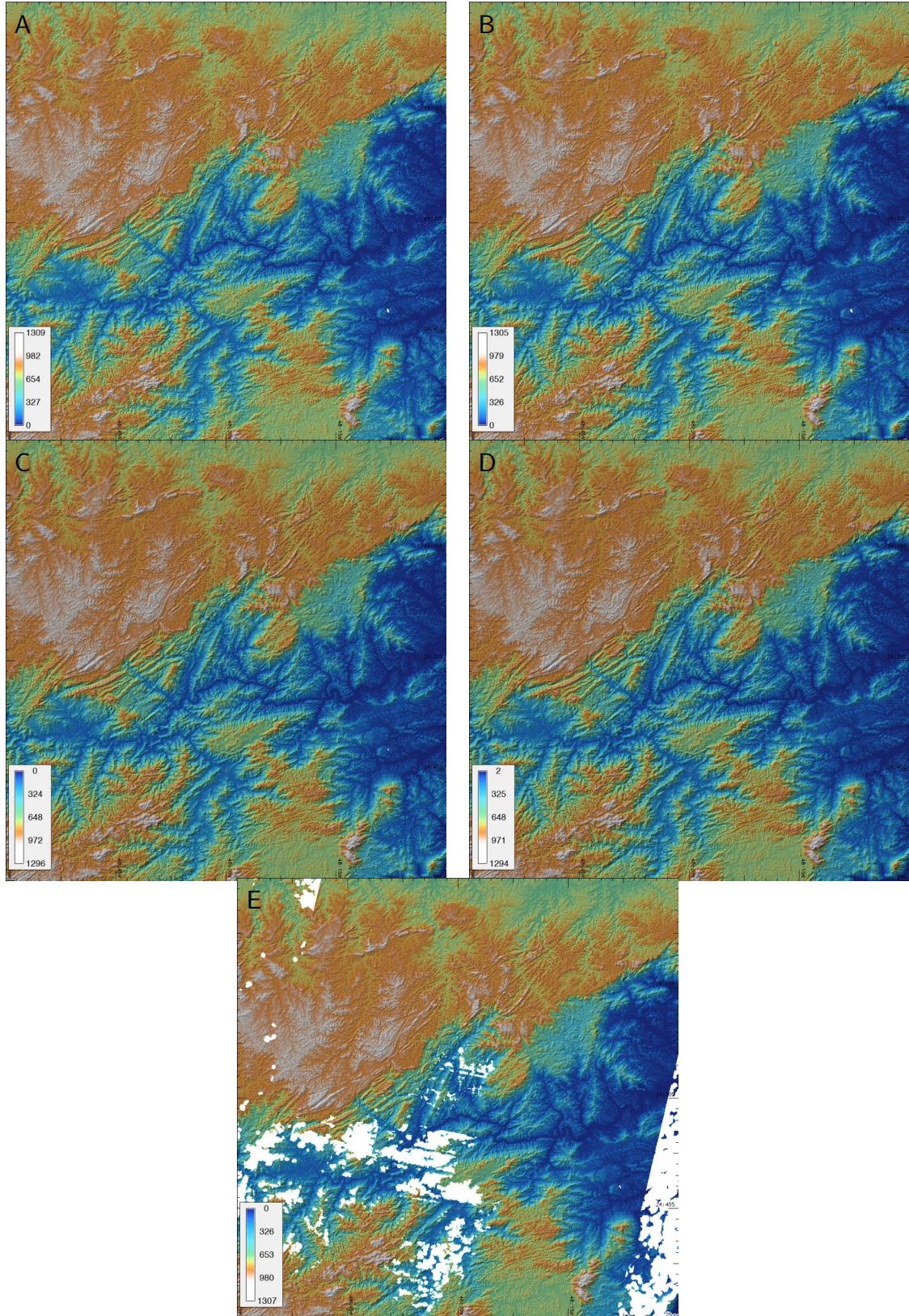


Figure S.2.4. Datasets for Iporanga area. A) TanDEM-X, 12 m resolution; B) TanDEM-X, 30 m resolution; C) SRTM, 30 m resolution; D) ASTER GDEM, 30 m resolution; E) ALOS AW3D, 30 m resolution.

2.5. Rio Claro

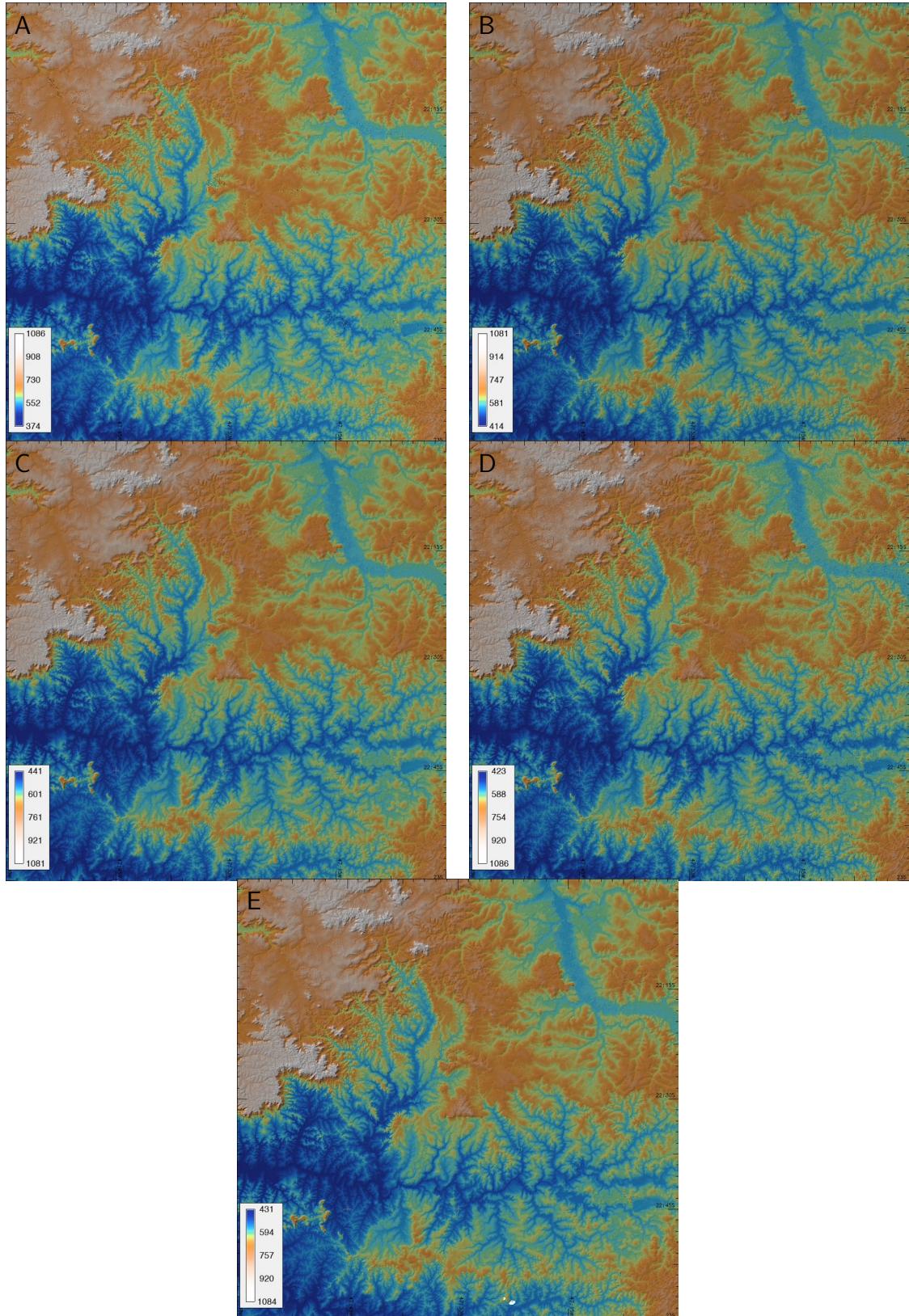


Figure S.2.5. Datasets for RioClaro area. A) TanDEM-X, 12 m resolution; B) TanDEM-X, 30 m resolution; C) SRTM, 30 m resolution; D) ASTER GDEM, 30 m resolution; E) ALOS AW3D, 30 m resolution.

2.6. Santa Catarina

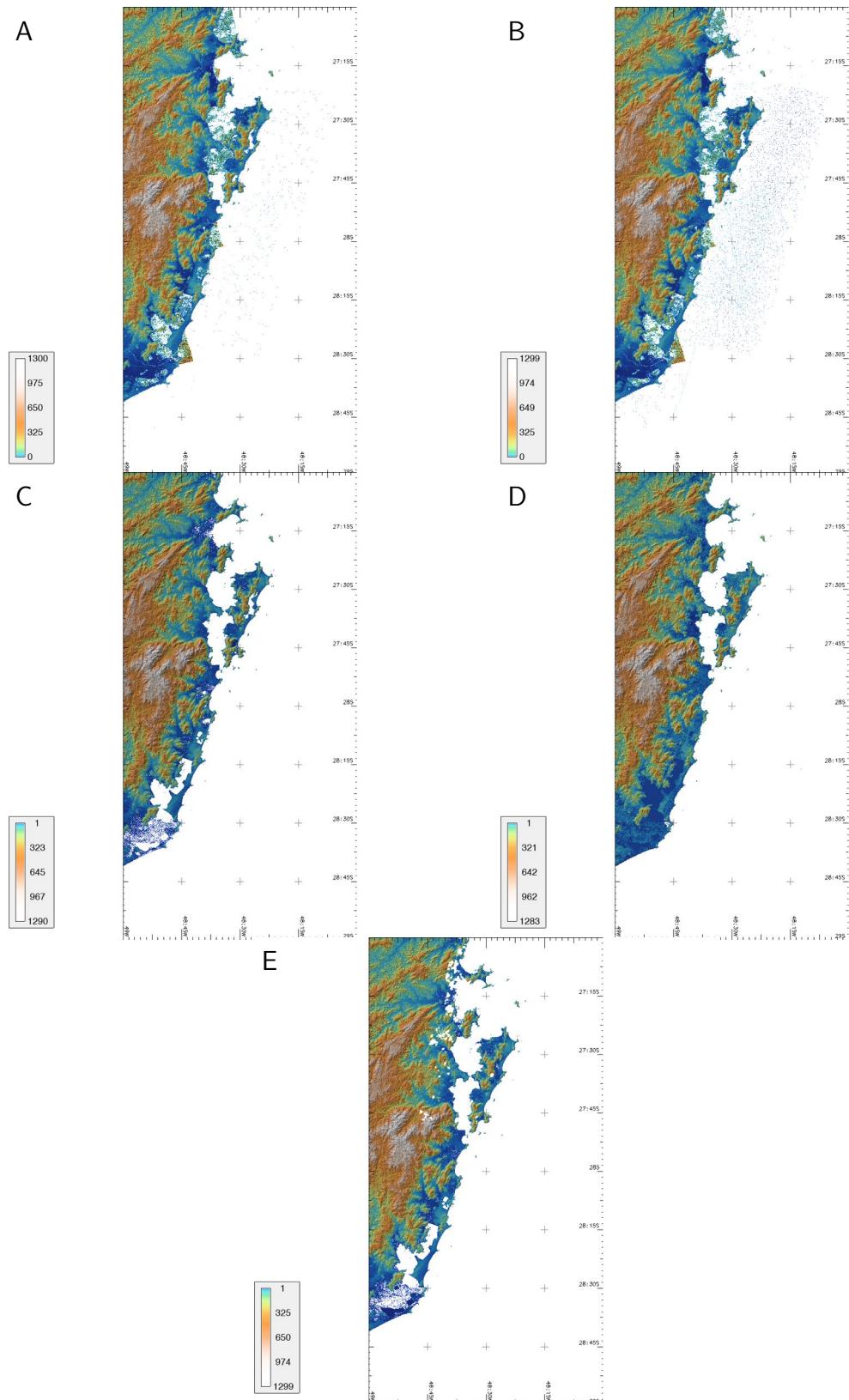


Figure S.2.6. Datasets for Santa Catarina area. A) TanDEM-X, 12 m resolution; B) TanDEM-X, 30 m resolution; C) SRTM, 30 m resolution; D) ASTER GDEM, 30 m resolution; E) ALOS AW3D, 30 m resolution.

2.7. Serra do Mar

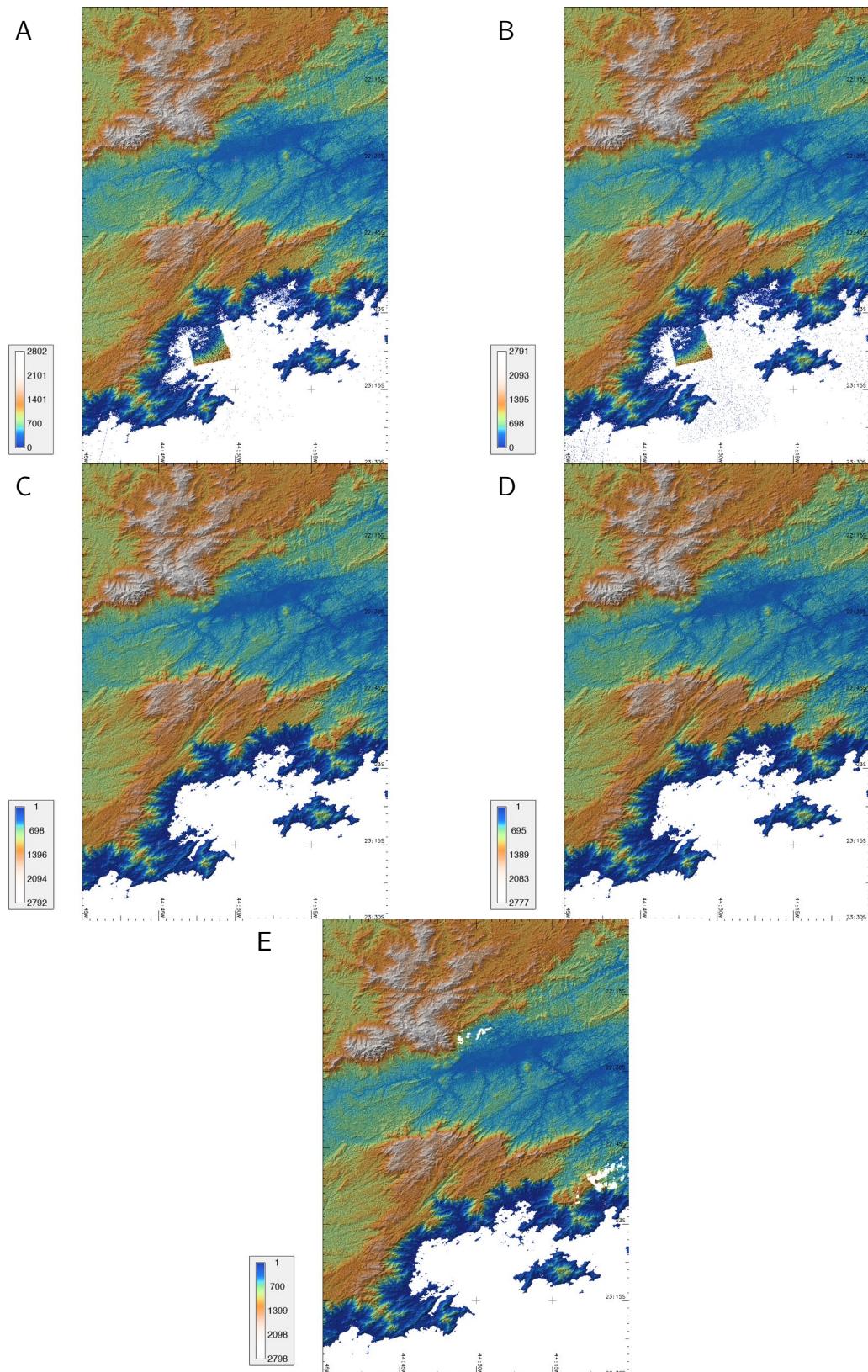


Figure S.2.7. Datasets for Serra do Mar area. A) TanDEM-X, 12 m resolution; B) TanDEM-X, 30 m resolution; C) SRTM, 30 m resolution; D) ASTER GDEM, 30 m resolution; E) ALOS AW3D, 30 m resolution.

3. Monte Carlo analysis

3.1. Mean and Standard deviation of correlation values

Table S.1. Mean correlation values for each set of n random points.

| Area | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Aracá | 0.9333 | 0.9289 | 0.9497 | 0.9830 | 0.9792 | 0.9971 | 0.9982 | 0.9988 |
| Barcelos | 0.9755 | 0.9861 | 0.9935 | 0.9961 | 0.9977 | 0.9988 | 0.9990 | 0.9991 |
| Pantanal | 0.9859 | 0.9926 | 0.9969 | 0.9981 | 0.9985 | 0.9990 | 0.9991 | 0.9995 |
| Iporanga | 0.9652 | 0.9737 | 0.9866 | 0.9928 | 0.9958 | 0.9974 | 0.9987 | 0.9989 |
| Rio Claro | 0.9739 | 0.9839 | 0.9924 | 0.9965 | 0.9983 | 0.9992 | 0.9996 | 0.9998 |
| Santa Catarina | 0.9682 | 0.9902 | 0.9928 | 0.9946 | 0.9968 | 0.9989 | 0.9997 | 0.9999 |
| Serra do Mar | 0.9459 | 0.9631 | 0.9783 | 0.9889 | 0.9939 | 0.9948 | 0.9982 | 0.9989 |

Table S.2. Standard deviation of correlation values for each set of n random points.

| Area | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|----------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Aracá | 0.056306 | 0.050098 | 0.034607 | 0.014847 | 0.012193 | 0.002535 | 0.001275 | 0.000927 |
| Barcelos | 0.014695 | 0.005813 | 0.003576 | 0.001861 | 0.000956 | 0.000453 | 0.000382 | 0.000211 |
| Pantanal | 0.005828 | 0.003489 | 0.001074 | 0.000587 | 0.000409 | 0.000199 | 0.000152 | 0.000138 |
| Iporanga | 0.025122 | 0.013550 | 0.006884 | 0.004850 | 0.002462 | 0.001665 | 0.001041 | 0.000837 |
| Rio Claro | 0.012653 | 0.006770 | 0.003088 | 0.001105 | 0.000578 | 0.000308 | 0.000147 | 0.000055 |
| Santa Catarina | 0.022021 | 0.007444 | 0.006202 | 0.003449 | 0.001927 | 0.000697 | 0.000189 | 0.000106 |
| Serra do Mar | 0.040692 | 0.024517 | 0.012520 | 0.004631 | 0.003674 | 0.001464 | 0.001305 | 0.000768 |

3.2. Aracá – correlation values

Table S.3. Aracá area. Correlation values for each set of n random points.

| run | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 0.9768 | 0.9265 | 0.9891 | 0.9946 | 0.9891 | 0.9992 | 0.9994 | 0.9990 |
| 1 | 0.8851 | 0.8537 | 0.8615 | 0.9882 | 0.9790 | 0.9995 | 0.9989 | 0.9995 |
| 2 | 0.9614 | 0.9625 | 0.9657 | 0.9912 | 0.9896 | 0.9990 | 0.9990 | 0.9994 |
| 3 | 0.8740 | 0.9682 | 0.9915 | 0.9912 | 0.9935 | 0.9950 | 0.9962 | 0.9989 |
| 4 | 0.9381 | 0.8979 | 0.9040 | 0.9672 | 0.9853 | 0.9989 | 0.9994 | 0.9987 |
| 5 | 0.9694 | 0.9327 | 0.9035 | 0.9724 | 0.9477 | 0.9966 | 0.9979 | 0.9981 |
| 6 | 0.9162 | 0.9784 | 0.9647 | 0.9886 | 0.9867 | 0.9996 | 0.9997 | 0.9996 |
| 7 | 0.9793 | 0.9633 | 0.9233 | 0.9856 | 0.9827 | 0.9985 | 0.9996 | 0.9997 |
| 8 | 0.9923 | 0.9757 | 0.9404 | 0.9545 | 0.9598 | 0.9887 | 0.9957 | 0.9983 |
| 9 | 0.9865 | 0.8644 | 0.9472 | 0.9907 | 0.9779 | 0.9978 | 0.9984 | 0.9993 |
| 10 | 0.9908 | 0.8688 | 0.9814 | 0.9947 | 0.9949 | 0.9961 | 0.9980 | 0.9995 |
| 11 | 0.9327 | 0.9137 | 0.9104 | 0.9680 | 0.9790 | 0.9980 | 0.9968 | 0.9989 |
| 12 | 0.9050 | 0.9395 | 0.9765 | 0.9808 | 0.9696 | 0.9988 | 0.9970 | 0.9969 |
| 13 | 0.9756 | 0.9261 | 0.9632 | 0.9491 | 0.9552 | 0.9964 | 0.9988 | 0.9993 |
| 14 | 0.9129 | 0.9438 | 0.9647 | 0.9946 | 0.9751 | 0.9985 | 0.9996 | 0.9995 |
| 15 | 0.9832 | 0.9003 | 0.9826 | 0.9940 | 0.9925 | 0.9996 | 0.9981 | 0.9996 |
| 16 | 0.9798 | 0.9763 | 0.9502 | 0.9766 | 0.9812 | 0.9985 | 0.9981 | 0.9971 |
| 17 | 0.8136 | 0.9356 | 0.9633 | 0.9915 | 0.9928 | 0.9993 | 0.9996 | 0.9998 |
| 18 | 0.9982 | 0.9920 | 0.9875 | 0.9895 | 0.9731 | 0.9969 | 0.9949 | 0.9952 |
| 19 | 0.9452 | 0.9505 | 0.9813 | 0.9838 | 0.9957 | 0.9970 | 0.9962 | 0.9984 |
| 20 | 0.9805 | 0.9416 | 0.9178 | 0.9673 | 0.9630 | 0.9955 | 0.9960 | 0.9983 |
| 21 | 0.9427 | 0.9442 | 0.9138 | 0.9830 | 0.9827 | 0.9974 | 0.9982 | 0.9986 |
| 22 | 0.9589 | 0.9877 | 0.9937 | 0.9944 | 0.9795 | 0.9976 | 0.9985 | 0.9993 |
| 23 | 0.7750 | 0.9605 | 0.9813 | 0.9896 | 0.9796 | 0.9962 | 0.9959 | 0.9988 |
| 24 | 0.9674 | 0.9412 | 0.9712 | 0.9883 | 0.9778 | 0.9993 | 0.9991 | 0.9998 |
| 25 | 0.8151 | 0.8882 | 0.9537 | 0.9844 | 0.9763 | 0.9954 | 0.9988 | 0.9992 |
| 26 | 0.9533 | 0.9504 | 0.8868 | 0.9174 | 0.9552 | 0.9949 | 0.9971 | 0.9971 |
| 27 | 0.8392 | 0.7888 | 0.9327 | 0.9894 | 0.9881 | 0.9987 | 0.9982 | 0.9988 |
| 28 | 0.9947 | 0.9936 | 0.9196 | 0.9739 | 0.9853 | 0.9984 | 0.9994 | 0.9991 |
| 29 | 0.9214 | 0.9428 | 0.9918 | 0.9945 | 0.9837 | 0.9971 | 0.9987 | 0.9997 |
| 30 | 0.9682 | 0.9529 | 0.9255 | 0.9757 | 0.9566 | 0.9981 | 0.9981 | 0.9991 |
| 31 | 0.9775 | 0.9428 | 0.9550 | 0.9934 | 0.9827 | 0.9915 | 0.9949 | 0.9978 |
| 32 | 0.9653 | 0.9381 | 0.9694 | 0.9969 | 0.9819 | 0.9994 | 0.9997 | 0.9997 |
| 33 | 0.9745 | 0.9824 | 0.9533 | 0.9749 | 0.9762 | 0.9964 | 0.9992 | 0.9995 |
| 34 | 0.8998 | 0.9058 | 0.9082 | 0.9755 | 0.9674 | 0.9978 | 0.9981 | 0.9988 |
| 35 | 0.9934 | 0.9975 | 0.9938 | 0.9927 | 0.9847 | 0.9989 | 0.9991 | 0.9991 |
| 36 | 0.8399 | 0.9799 | 0.9720 | 0.9915 | 0.9724 | 0.9960 | 0.9974 | 0.9991 |
| 37 | 0.9727 | 0.8655 | 0.9669 | 0.9918 | 0.9868 | 0.9992 | 0.9993 | 0.9967 |
| 38 | 0.8133 | 0.9739 | 0.9185 | 0.9554 | 0.9572 | 0.9947 | 0.9991 | 0.9994 |
| 39 | 0.9460 | 0.9695 | 0.9042 | 0.9915 | 0.9970 | 0.9954 | 0.9986 | 0.9987 |
| 40 | 0.9604 | 0.8579 | 0.9055 | 0.9886 | 0.9818 | 0.9971 | 0.9987 | 0.9992 |
| 41 | 0.9665 | 0.9621 | 0.9805 | 0.9920 | 0.9655 | 0.9988 | 0.9993 | 0.9993 |
| 42 | 0.9215 | 0.8961 | 0.9902 | 0.9956 | 0.9947 | 0.9977 | 0.9988 | 0.9995 |
| 43 | 0.9170 | 0.9507 | 0.9862 | 0.9842 | 0.9960 | 0.9984 | 0.9987 | 0.9986 |
| 44 | 0.8380 | 0.8235 | 0.9487 | 0.9948 | 0.9843 | 0.9880 | 0.9980 | 0.9980 |
| 45 | 0.9294 | 0.9313 | 0.9688 | 0.9845 | 0.9886 | 0.9931 | 0.9988 | 0.9990 |
| 46 | 0.9070 | 0.8682 | 0.9454 | 0.9925 | 0.9868 | 0.9975 | 0.9989 | 0.9994 |
| 47 | 0.9342 | 0.8022 | 0.8719 | 0.9870 | 0.9826 | 0.9989 | 0.9981 | 0.9982 |
| 48 | 0.9443 | 0.9067 | 0.9575 | 0.9798 | 0.9677 | 0.9992 | 0.9970 | 0.9988 |

3.3. Barcelos – correlation values

Table S.4. Barcelos area. Correlation values for each set of n random points.

| run | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 0.9639 | 0.9770 | 0.9849 | 0.9954 | 0.9982 | 0.9990 | 0.9986 | 0.9991 |
| 1 | 0.9850 | 0.9843 | 0.9856 | 0.9918 | 0.9977 | 0.9983 | 0.9990 | 0.9993 |
| 2 | 0.9790 | 0.9890 | 0.9926 | 0.9955 | 0.9976 | 0.9984 | 0.9993 | 0.9991 |
| 3 | 0.9924 | 0.9941 | 0.9969 | 0.9983 | 0.9989 | 0.9991 | 0.9994 | 0.9987 |
| 4 | 0.9798 | 0.9897 | 0.9966 | 0.9976 | 0.9980 | 0.9991 | 0.9991 | 0.9991 |
| 5 | 0.9803 | 0.9912 | 0.9901 | 0.9934 | 0.9969 | 0.9992 | 0.9994 | 0.9990 |
| 6 | 0.9854 | 0.9832 | 0.9871 | 0.9940 | 0.9971 | 0.9988 | 0.9991 | 0.9993 |
| 7 | 0.9633 | 0.9838 | 0.9945 | 0.9962 | 0.9985 | 0.9990 | 0.9991 | 0.9990 |
| 8 | 0.9826 | 0.9891 | 0.9951 | 0.9985 | 0.9987 | 0.9977 | 0.9987 | 0.9995 |
| 9 | 0.9907 | 0.9751 | 0.9815 | 0.9908 | 0.9979 | 0.9991 | 0.9993 | 0.9992 |
| 10 | 0.9850 | 0.9829 | 0.9865 | 0.9952 | 0.9971 | 0.9987 | 0.9993 | 0.9992 |
| 11 | 0.9920 | 0.9911 | 0.9941 | 0.9963 | 0.9973 | 0.9994 | 0.9988 | 0.9992 |
| 12 | 0.9696 | 0.9855 | 0.9961 | 0.9976 | 0.9987 | 0.9991 | 0.9995 | 0.9991 |
| 13 | 0.9845 | 0.9877 | 0.9937 | 0.9934 | 0.9966 | 0.9982 | 0.9993 | 0.9991 |
| 14 | 0.9830 | 0.9903 | 0.9934 | 0.9962 | 0.9979 | 0.9990 | 0.9990 | 0.9994 |
| 15 | 0.9762 | 0.9867 | 0.9936 | 0.9951 | 0.9978 | 0.9988 | 0.9991 | 0.9990 |
| 16 | 0.9797 | 0.9913 | 0.9950 | 0.9966 | 0.9983 | 0.9991 | 0.9987 | 0.9992 |
| 17 | 0.9568 | 0.9799 | 0.9942 | 0.9961 | 0.9974 | 0.9990 | 0.9990 | 0.9992 |
| 18 | 0.9656 | 0.9806 | 0.9946 | 0.9980 | 0.9990 | 0.9990 | 0.9991 | 0.9990 |
| 19 | 0.9511 | 0.9724 | 0.9974 | 0.9983 | 0.9986 | 0.9991 | 0.9993 | 0.9989 |
| 20 | 0.9771 | 0.9870 | 0.9925 | 0.9963 | 0.9980 | 0.9990 | 0.9991 | 0.9990 |
| 21 | 0.9881 | 0.9894 | 0.9973 | 0.9983 | 0.9984 | 0.9986 | 0.9989 | 0.9992 |
| 22 | 0.9836 | 0.9767 | 0.9980 | 0.9975 | 0.9988 | 0.9992 | 0.9994 | 0.9990 |
| 23 | 0.9756 | 0.9837 | 0.9919 | 0.9939 | 0.9978 | 0.9985 | 0.9989 | 0.9988 |
| 24 | 0.9867 | 0.9824 | 0.9979 | 0.9984 | 0.9988 | 0.9989 | 0.9992 | 0.9992 |
| 25 | 0.9913 | 0.9830 | 0.9937 | 0.9963 | 0.9980 | 0.9993 | 0.9993 | 0.9993 |
| 26 | 0.9633 | 0.9823 | 0.9935 | 0.9966 | 0.9977 | 0.9988 | 0.9989 | 0.9987 |
| 27 | 0.9879 | 0.9956 | 0.9949 | 0.9969 | 0.9984 | 0.9991 | 0.9994 | 0.9991 |
| 28 | 0.9617 | 0.9906 | 0.9949 | 0.9976 | 0.9979 | 0.9990 | 0.9994 | 0.9992 |
| 29 | 0.9796 | 0.9909 | 0.9968 | 0.9983 | 0.9985 | 0.9992 | 0.9991 | 0.9995 |
| 30 | 0.9884 | 0.9892 | 0.9938 | 0.9943 | 0.9966 | 0.9990 | 0.9991 | 0.9987 |
| 31 | 0.9838 | 0.9860 | 0.9912 | 0.9955 | 0.9966 | 0.9987 | 0.9973 | 0.9989 |
| 32 | 0.9154 | 0.9689 | 0.9959 | 0.9984 | 0.9989 | 0.9990 | 0.9990 | 0.9990 |
| 33 | 0.9604 | 0.9904 | 0.9943 | 0.9969 | 0.9971 | 0.9989 | 0.9992 | 0.9993 |
| 34 | 0.9610 | 0.9899 | 0.9970 | 0.9972 | 0.9983 | 0.9989 | 0.9989 | 0.9995 |
| 35 | 0.9906 | 0.9886 | 0.9973 | 0.9979 | 0.9983 | 0.9986 | 0.9991 | 0.9990 |
| 36 | 0.9771 | 0.9919 | 0.9940 | 0.9960 | 0.9949 | 0.9978 | 0.9988 | 0.9996 |
| 37 | 0.9886 | 0.9962 | 0.9937 | 0.9954 | 0.9966 | 0.9990 | 0.9994 | 0.9993 |
| 38 | 0.9792 | 0.9880 | 0.9926 | 0.9959 | 0.9954 | 0.9984 | 0.9991 | 0.9993 |
| 39 | 0.9473 | 0.9866 | 0.9955 | 0.9977 | 0.9961 | 0.9984 | 0.9989 | 0.9988 |
| 40 | 0.9748 | 0.9876 | 0.9931 | 0.9960 | 0.9987 | 0.9986 | 0.9993 | 0.9990 |
| 41 | 0.9713 | 0.9801 | 0.9926 | 0.9938 | 0.9975 | 0.9984 | 0.9987 | 0.9989 |
| 42 | 0.9657 | 0.9850 | 0.9956 | 0.9972 | 0.9977 | 0.9991 | 0.9992 | 0.9992 |
| 43 | 0.9887 | 0.9896 | 0.9942 | 0.9959 | 0.9964 | 0.9987 | 0.9992 | 0.9989 |
| 44 | 0.9841 | 0.9883 | 0.9909 | 0.9962 | 0.9979 | 0.9989 | 0.9993 | 0.9989 |
| 45 | 0.9778 | 0.9846 | 0.9886 | 0.9919 | 0.9957 | 0.9985 | 0.9993 | 0.9992 |
| 46 | 0.9839 | 0.9891 | 0.9958 | 0.9966 | 0.9976 | 0.9968 | 0.9980 | 0.9993 |
| 47 | 0.9513 | 0.9789 | 0.9918 | 0.9955 | 0.9978 | 0.9989 | 0.9992 | 0.9991 |
| 48 | 0.9682 | 0.9940 | 0.9977 | 0.9985 | 0.9988 | 0.9988 | 0.9984 | 0.9994 |

3.4. Pantanal – correlation values

Table S.5. Pantanal area. Correlation values for each set of n random points.

| run | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 0.9830 | 0.9958 | 0.9976 | 0.9980 | 0.9988 | 0.9991 | 0.9991 | 0.9994 |
| 1 | 0.9824 | 0.9936 | 0.9972 | 0.9964 | 0.9982 | 0.9990 | 0.9990 | 0.9992 |
| 2 | 0.9876 | 0.9860 | 0.9983 | 0.9981 | 0.9985 | 0.9994 | 0.9989 | 0.9995 |
| 3 | 0.9863 | 0.9956 | 0.9975 | 0.9987 | 0.9990 | 0.9987 | 0.9989 | 0.9992 |
| 4 | 0.9840 | 0.9840 | 0.9980 | 0.9977 | 0.9986 | 0.9988 | 0.9993 | 0.9996 |
| 5 | 0.9843 | 0.9956 | 0.9980 | 0.9982 | 0.9987 | 0.9989 | 0.9991 | 0.9995 |
| 6 | 0.9933 | 0.9939 | 0.9965 | 0.9983 | 0.9988 | 0.9991 | 0.9991 | 0.9993 |
| 7 | 0.9710 | 0.9831 | 0.9970 | 0.9982 | 0.9986 | 0.9992 | 0.9993 | 0.9995 |
| 8 | 0.9725 | 0.9934 | 0.9974 | 0.9986 | 0.9981 | 0.9988 | 0.9988 | 0.9991 |
| 9 | 0.9857 | 0.9953 | 0.9969 | 0.9982 | 0.9987 | 0.9992 | 0.9992 | 0.9995 |
| 10 | 0.9896 | 0.9945 | 0.9945 | 0.9976 | 0.9989 | 0.9992 | 0.9992 | 0.9994 |
| 11 | 0.9808 | 0.9917 | 0.9949 | 0.9986 | 0.9988 | 0.9991 | 0.9994 | 0.9995 |
| 12 | 0.9860 | 0.9922 | 0.9977 | 0.9985 | 0.9986 | 0.9991 | 0.9991 | 0.9994 |
| 13 | 0.9854 | 0.9893 | 0.9969 | 0.9976 | 0.9984 | 0.9992 | 0.9992 | 0.9996 |
| 14 | 0.9885 | 0.9937 | 0.9964 | 0.9986 | 0.9986 | 0.9988 | 0.9992 | 0.9995 |
| 15 | 0.9875 | 0.9955 | 0.9982 | 0.9983 | 0.9988 | 0.9991 | 0.9993 | 0.9997 |
| 16 | 0.9911 | 0.9952 | 0.9981 | 0.9982 | 0.9989 | 0.9990 | 0.9991 | 0.9994 |
| 17 | 0.9756 | 0.9954 | 0.9951 | 0.9979 | 0.9990 | 0.9989 | 0.9991 | 0.9995 |
| 18 | 0.9910 | 0.9878 | 0.9974 | 0.9984 | 0.9987 | 0.9992 | 0.9992 | 0.9996 |
| 19 | 0.9903 | 0.9952 | 0.9969 | 0.9983 | 0.9991 | 0.9990 | 0.9990 | 0.9994 |
| 20 | 0.9878 | 0.9938 | 0.9963 | 0.9977 | 0.9981 | 0.9989 | 0.9989 | 0.9994 |
| 21 | 0.9889 | 0.9942 | 0.9970 | 0.9988 | 0.9988 | 0.9990 | 0.9992 | 0.9996 |
| 22 | 0.9877 | 0.9903 | 0.9961 | 0.9958 | 0.9978 | 0.9987 | 0.9990 | 0.9995 |
| 23 | 0.9907 | 0.9952 | 0.9985 | 0.9987 | 0.9979 | 0.9989 | 0.9989 | 0.9996 |
| 24 | 0.9881 | 0.9947 | 0.9974 | 0.9980 | 0.9985 | 0.9991 | 0.9993 | 0.9996 |
| 25 | 0.9864 | 0.9948 | 0.9979 | 0.9988 | 0.9990 | 0.9993 | 0.9993 | 0.9992 |
| 26 | 0.9936 | 0.9952 | 0.9970 | 0.9981 | 0.9982 | 0.9991 | 0.9993 | 0.9996 |
| 27 | 0.9935 | 0.9969 | 0.9975 | 0.9987 | 0.9986 | 0.9991 | 0.9991 | 0.9995 |
| 28 | 0.9808 | 0.9935 | 0.9965 | 0.9978 | 0.9987 | 0.9991 | 0.9992 | 0.9995 |
| 29 | 0.9791 | 0.9891 | 0.9976 | 0.9985 | 0.9988 | 0.9991 | 0.9991 | 0.9995 |
| 30 | 0.9930 | 0.9948 | 0.9977 | 0.9979 | 0.9975 | 0.9984 | 0.9990 | 0.9997 |
| 31 | 0.9699 | 0.9897 | 0.9975 | 0.9987 | 0.9989 | 0.9989 | 0.9993 | 0.9996 |
| 32 | 0.9862 | 0.9880 | 0.9976 | 0.9985 | 0.9980 | 0.9988 | 0.9989 | 0.9992 |
| 33 | 0.9896 | 0.9965 | 0.9979 | 0.9984 | 0.9984 | 0.9992 | 0.9993 | 0.9993 |
| 34 | 0.9839 | 0.9883 | 0.9957 | 0.9977 | 0.9982 | 0.9989 | 0.9990 | 0.9994 |
| 35 | 0.9931 | 0.9936 | 0.9968 | 0.9984 | 0.9981 | 0.9989 | 0.9992 | 0.9996 |
| 36 | 0.9885 | 0.9935 | 0.9937 | 0.9977 | 0.9984 | 0.9989 | 0.9990 | 0.9993 |
| 37 | 0.9909 | 0.9941 | 0.9977 | 0.9987 | 0.9990 | 0.9988 | 0.9989 | 0.9994 |
| 38 | 0.9829 | 0.9935 | 0.9972 | 0.9983 | 0.9988 | 0.9990 | 0.9989 | 0.9994 |
| 39 | 0.9767 | 0.9937 | 0.9949 | 0.9975 | 0.9986 | 0.9988 | 0.9992 | 0.9993 |
| 40 | 0.9880 | 0.9855 | 0.9969 | 0.9970 | 0.9975 | 0.9987 | 0.9988 | 0.9993 |
| 41 | 0.9859 | 0.9930 | 0.9969 | 0.9980 | 0.9984 | 0.9992 | 0.9992 | 0.9996 |
| 42 | 0.9920 | 0.9959 | 0.9951 | 0.9980 | 0.9986 | 0.9990 | 0.9992 | 0.9996 |
| 43 | 0.9883 | 0.9912 | 0.9964 | 0.9970 | 0.9978 | 0.9992 | 0.9991 | 0.9994 |
| 44 | 0.9873 | 0.9956 | 0.9975 | 0.9983 | 0.9980 | 0.9989 | 0.9991 | 0.9996 |
| 45 | 0.9918 | 0.9934 | 0.9977 | 0.9980 | 0.9984 | 0.9991 | 0.9991 | 0.9993 |
| 46 | 0.9893 | 0.9947 | 0.9966 | 0.9985 | 0.9988 | 0.9994 | 0.9990 | 0.9993 |
| 47 | 0.9828 | 0.9855 | 0.9951 | 0.9981 | 0.9989 | 0.9988 | 0.9990 | 0.9995 |
| 48 | 0.9770 | 0.9907 | 0.9968 | 0.9979 | 0.9979 | 0.9989 | 0.9991 | 0.9997 |

3.5. Iporanga – correlation values

Table S.6. Iporanga area. Correlation values for each set of n random points.

| run | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 0.9739 | 0.9966 | 0.9822 | 0.9942 | 0.9972 | 0.9995 | 0.9997 | 0.9999 |
| 1 | 0.9861 | 0.9953 | 0.9805 | 0.9951 | 0.9951 | 0.9980 | 0.9992 | 0.9998 |
| 2 | 0.9555 | 0.9915 | 0.9956 | 0.9981 | 0.9990 | 0.9991 | 0.9999 | 1.0000 |
| 3 | 0.9629 | 0.9846 | 0.9986 | 0.9982 | 0.9979 | 0.9992 | 0.9998 | 0.9999 |
| 4 | 0.9652 | 0.9922 | 0.9957 | 0.9976 | 0.9965 | 0.9991 | 0.9998 | 0.9999 |
| 5 | 0.9617 | 0.9910 | 0.9938 | 0.9953 | 0.9971 | 0.9991 | 0.9999 | 0.9999 |
| 6 | 0.9409 | 0.9849 | 0.9947 | 0.9968 | 0.9989 | 0.9992 | 0.9999 | 0.9999 |
| 7 | 0.9704 | 0.9953 | 0.9896 | 0.9922 | 0.9945 | 0.9986 | 0.9996 | 0.9999 |
| 8 | 0.9619 | 0.9779 | 0.9986 | 0.9977 | 0.9993 | 0.9987 | 0.9996 | 0.9999 |
| 9 | 0.9846 | 0.9933 | 0.9956 | 0.9958 | 0.9977 | 0.9989 | 0.9995 | 0.9999 |
| 10 | 0.9909 | 0.9950 | 0.9874 | 0.9948 | 0.9970 | 0.9995 | 0.9998 | 1.0000 |
| 11 | 0.9415 | 0.9858 | 0.9954 | 0.9953 | 0.9946 | 0.9986 | 0.9998 | 0.9999 |
| 12 | 0.9128 | 0.9660 | 0.9967 | 0.9933 | 0.9978 | 0.9992 | 0.9998 | 0.9999 |
| 13 | 0.9478 | 0.9804 | 0.9964 | 0.9970 | 0.9975 | 0.9998 | 0.9999 | 0.9999 |
| 14 | 0.9826 | 0.9949 | 0.9919 | 0.9898 | 0.9939 | 0.9976 | 0.9996 | 0.9997 |
| 15 | 0.9568 | 0.9871 | 0.9972 | 0.9979 | 0.9989 | 0.9993 | 0.9997 | 0.9998 |
| 16 | 0.9701 | 0.9984 | 0.9876 | 0.9951 | 0.9979 | 0.9997 | 0.9999 | 0.9999 |
| 17 | 0.9671 | 0.9940 | 0.9960 | 0.9993 | 0.9993 | 0.9994 | 0.9996 | 0.9999 |
| 18 | 0.9814 | 0.9912 | 0.9930 | 0.9970 | 0.9976 | 0.9989 | 0.9997 | 0.9998 |
| 19 | 0.9922 | 0.9972 | 0.9962 | 0.9943 | 0.9973 | 0.9996 | 0.9999 | 0.9999 |
| 20 | 0.9240 | 0.9874 | 0.9981 | 0.9992 | 0.9993 | 0.9995 | 0.9998 | 1.0000 |
| 21 | 0.9599 | 0.9904 | 0.9959 | 0.9961 | 0.9977 | 0.9993 | 0.9998 | 0.9999 |
| 22 | 0.9569 | 0.9812 | 0.9970 | 0.9958 | 0.9950 | 0.9990 | 0.9998 | 0.9999 |
| 23 | 0.9287 | 0.9827 | 0.9971 | 0.9952 | 0.9978 | 0.9995 | 0.9998 | 0.9999 |
| 24 | 0.9909 | 0.9976 | 0.9940 | 0.9923 | 0.9958 | 0.9988 | 0.9999 | 0.9999 |
| 25 | 0.9930 | 0.9957 | 0.9916 | 0.9901 | 0.9938 | 0.9980 | 0.9995 | 0.9996 |
| 26 | 0.9934 | 0.9954 | 0.9857 | 0.9898 | 0.9974 | 0.9994 | 0.9998 | 0.9999 |
| 27 | 0.9916 | 0.9956 | 0.9823 | 0.9949 | 0.9978 | 0.9991 | 0.9999 | 0.9999 |
| 28 | 0.9790 | 0.9961 | 0.9901 | 0.9888 | 0.9924 | 0.9980 | 0.9991 | 0.9996 |
| 29 | 0.9898 | 0.9954 | 0.9939 | 0.9927 | 0.9957 | 0.9991 | 0.9998 | 0.9998 |
| 30 | 0.9953 | 0.9968 | 0.9942 | 0.9945 | 0.9978 | 0.9997 | 0.9998 | 0.9999 |
| 31 | 0.9850 | 0.9949 | 0.9929 | 0.9929 | 0.9943 | 0.9985 | 0.9997 | 0.9999 |
| 32 | 0.9689 | 0.9851 | 0.9985 | 0.9990 | 0.9978 | 0.9992 | 0.9999 | 0.9999 |
| 33 | 0.9494 | 0.9950 | 0.9941 | 0.9947 | 0.9951 | 0.9971 | 0.9995 | 0.9996 |
| 34 | 0.9368 | 0.9822 | 0.9989 | 0.9978 | 0.9993 | 0.9996 | 0.9999 | 0.9999 |
| 35 | 0.9849 | 0.9948 | 0.9922 | 0.9952 | 0.9976 | 0.9995 | 0.9999 | 1.0000 |
| 36 | 0.9930 | 0.9907 | 0.9983 | 0.9980 | 0.9990 | 0.9995 | 0.9997 | 0.9998 |
| 37 | 0.9615 | 0.9930 | 0.9941 | 0.9952 | 0.9946 | 0.9988 | 0.9999 | 0.9998 |
| 38 | 0.9939 | 0.9921 | 0.9779 | 0.9840 | 0.9929 | 0.9979 | 0.9994 | 0.9996 |
| 39 | 0.9903 | 0.9840 | 0.9984 | 0.9948 | 0.9951 | 0.9983 | 0.9995 | 0.9999 |
| 40 | 0.9351 | 0.9690 | 0.9987 | 0.9946 | 0.9976 | 0.9994 | 0.9999 | 0.9999 |
| 41 | 0.9412 | 0.9790 | 0.9972 | 0.9966 | 0.9979 | 0.9985 | 0.9995 | 0.9997 |
| 42 | 0.9741 | 0.9969 | 0.9823 | 0.9837 | 0.9951 | 0.9982 | 0.9999 | 0.9998 |
| 43 | 0.9706 | 0.9906 | 0.9894 | 0.9941 | 0.9973 | 0.9990 | 0.9997 | 0.9998 |
| 44 | 0.9907 | 0.9982 | 0.9887 | 0.9928 | 0.9976 | 0.9991 | 0.9999 | 0.9998 |
| 45 | 0.9814 | 0.9958 | 0.9942 | 0.9947 | 0.9983 | 0.9989 | 0.9999 | 1.0000 |
| 46 | 0.9477 | 0.9817 | 0.9983 | 0.9994 | 0.9994 | 0.9999 | 0.9999 | 0.9999 |
| 47 | 0.9944 | 0.9956 | 0.9707 | 0.9895 | 0.9929 | 0.9965 | 0.9996 | 0.9999 |
| 48 | 0.9347 | 0.9963 | 0.9978 | 0.9944 | 0.9943 | 0.9995 | 0.9999 | 0.9999 |

3.6. Rio Claro – correlation values

Table S.7. Rio Claro area. Correlation values for each set of n random points.

| run | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 0.9814 | 0.9870 | 0.9931 | 0.9960 | 0.9982 | 0.9992 | 0.9997 | 0.9998 |
| 1 | 0.9657 | 0.9912 | 0.9938 | 0.9962 | 0.9970 | 0.9988 | 0.9994 | 0.9998 |
| 2 | 0.9615 | 0.9874 | 0.9926 | 0.9976 | 0.9993 | 0.9994 | 0.9996 | 0.9998 |
| 3 | 0.9862 | 0.9879 | 0.9849 | 0.9937 | 0.9975 | 0.9986 | 0.9993 | 0.9998 |
| 4 | 0.9899 | 0.9858 | 0.9932 | 0.9973 | 0.9981 | 0.9992 | 0.9995 | 0.9998 |
| 5 | 0.9718 | 0.9901 | 0.9899 | 0.9953 | 0.9986 | 0.9984 | 0.9994 | 0.9998 |
| 6 | 0.9776 | 0.9875 | 0.9946 | 0.9974 | 0.9989 | 0.9994 | 0.9995 | 0.9998 |
| 7 | 0.9879 | 0.9782 | 0.9867 | 0.9940 | 0.9981 | 0.9992 | 0.9996 | 0.9997 |
| 8 | 0.9836 | 0.9830 | 0.9943 | 0.9969 | 0.9986 | 0.9995 | 0.9996 | 0.9998 |
| 9 | 0.9582 | 0.9765 | 0.9841 | 0.9951 | 0.9976 | 0.9988 | 0.9995 | 0.9997 |
| 10 | 0.9430 | 0.9732 | 0.9940 | 0.9957 | 0.9969 | 0.9989 | 0.9996 | 0.9998 |
| 11 | 0.9889 | 0.9818 | 0.9893 | 0.9961 | 0.9988 | 0.9988 | 0.9994 | 0.9997 |
| 12 | 0.9443 | 0.9729 | 0.9957 | 0.9959 | 0.9977 | 0.9992 | 0.9996 | 0.9998 |
| 13 | 0.9580 | 0.9819 | 0.9936 | 0.9965 | 0.9984 | 0.9992 | 0.9997 | 0.9998 |
| 14 | 0.9745 | 0.9858 | 0.9941 | 0.9966 | 0.9979 | 0.9991 | 0.9996 | 0.9998 |
| 15 | 0.9773 | 0.9909 | 0.9939 | 0.9980 | 0.9990 | 0.9994 | 0.9994 | 0.9998 |
| 16 | 0.9612 | 0.9634 | 0.9900 | 0.9953 | 0.9981 | 0.9992 | 0.9998 | 0.9999 |
| 17 | 0.9837 | 0.9887 | 0.9944 | 0.9978 | 0.9990 | 0.9993 | 0.9996 | 0.9999 |
| 18 | 0.9853 | 0.9912 | 0.9969 | 0.9973 | 0.9984 | 0.9993 | 0.9997 | 0.9997 |
| 19 | 0.9713 | 0.9877 | 0.9950 | 0.9981 | 0.9980 | 0.9990 | 0.9995 | 0.9998 |
| 20 | 0.9753 | 0.9861 | 0.9893 | 0.9964 | 0.9984 | 0.9993 | 0.9997 | 0.9998 |
| 21 | 0.9604 | 0.9837 | 0.9959 | 0.9968 | 0.9983 | 0.9993 | 0.9998 | 0.9999 |
| 22 | 0.9910 | 0.9702 | 0.9864 | 0.9957 | 0.9991 | 0.9990 | 0.9997 | 0.9999 |
| 23 | 0.9562 | 0.9786 | 0.9921 | 0.9971 | 0.9987 | 0.9983 | 0.9993 | 0.9999 |
| 24 | 0.9805 | 0.9930 | 0.9887 | 0.9960 | 0.9979 | 0.9992 | 0.9997 | 0.9999 |
| 25 | 0.9803 | 0.9861 | 0.9927 | 0.9960 | 0.9986 | 0.9996 | 0.9997 | 0.9999 |
| 26 | 0.9835 | 0.9841 | 0.9894 | 0.9958 | 0.9976 | 0.9991 | 0.9997 | 0.9999 |
| 27 | 0.9595 | 0.9860 | 0.9936 | 0.9960 | 0.9973 | 0.9990 | 0.9996 | 0.9999 |
| 28 | 0.9475 | 0.9624 | 0.9931 | 0.9972 | 0.9988 | 0.9994 | 0.9998 | 0.9999 |
| 29 | 0.9797 | 0.9892 | 0.9946 | 0.9955 | 0.9983 | 0.9992 | 0.9997 | 0.9999 |
| 30 | 0.9775 | 0.9906 | 0.9918 | 0.9979 | 0.9981 | 0.9987 | 0.9995 | 0.9999 |
| 31 | 0.9784 | 0.9894 | 0.9943 | 0.9982 | 0.9986 | 0.9993 | 0.9998 | 0.9999 |
| 32 | 0.9796 | 0.9831 | 0.9914 | 0.9952 | 0.9984 | 0.9988 | 0.9996 | 0.9999 |
| 33 | 0.9619 | 0.9759 | 0.9931 | 0.9975 | 0.9988 | 0.9992 | 0.9997 | 0.9998 |
| 34 | 0.9740 | 0.9827 | 0.9918 | 0.9974 | 0.9988 | 0.9991 | 0.9993 | 0.9998 |
| 35 | 0.9823 | 0.9845 | 0.9896 | 0.9945 | 0.9978 | 0.9993 | 0.9996 | 0.9998 |
| 36 | 0.9585 | 0.9795 | 0.9946 | 0.9979 | 0.9981 | 0.9994 | 0.9998 | 0.9999 |
| 37 | 0.9843 | 0.9900 | 0.9945 | 0.9972 | 0.9986 | 0.9993 | 0.9997 | 0.9999 |
| 38 | 0.9708 | 0.9903 | 0.9959 | 0.9973 | 0.9971 | 0.9987 | 0.9996 | 0.9999 |
| 39 | 0.9914 | 0.9877 | 0.9929 | 0.9972 | 0.9988 | 0.9995 | 0.9997 | 0.9999 |
| 40 | 0.9869 | 0.9846 | 0.9912 | 0.9971 | 0.9981 | 0.9991 | 0.9996 | 0.9998 |
| 41 | 0.9917 | 0.9780 | 0.9939 | 0.9965 | 0.9991 | 0.9996 | 0.9999 | 0.9999 |
| 42 | 0.9878 | 0.9886 | 0.9953 | 0.9976 | 0.9987 | 0.9991 | 0.9997 | 0.9999 |
| 43 | 0.9759 | 0.9853 | 0.9960 | 0.9978 | 0.9982 | 0.9991 | 0.9997 | 0.9999 |
| 44 | 0.9663 | 0.9853 | 0.9917 | 0.9966 | 0.9984 | 0.9996 | 0.9997 | 0.9997 |
| 45 | 0.9753 | 0.9843 | 0.9959 | 0.9972 | 0.9978 | 0.9994 | 0.9997 | 0.9999 |
| 46 | 0.9764 | 0.9829 | 0.9865 | 0.9956 | 0.9987 | 0.9995 | 0.9998 | 0.9999 |
| 47 | 0.9626 | 0.9894 | 0.9964 | 0.9978 | 0.9988 | 0.9997 | 0.9998 | 0.9999 |
| 48 | 0.9758 | 0.9862 | 0.9905 | 0.9950 | 0.9988 | 0.9989 | 0.9997 | 0.9999 |

3.7. Santa Catarina – correlation values

Table S.8. Santa Catarina area. Correlation values for each set of n random points.

| run | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 0.9426 | 0.9422 | 0.9595 | 0.9774 | 0.9893 | 0.9970 | 0.9980 | 0.9983 |
| 1 | 0.9545 | 0.9842 | 0.9803 | 0.9866 | 0.9926 | 0.9916 | 0.9970 | 0.9992 |
| 2 | 0.9547 | 0.9714 | 0.9928 | 0.9850 | 0.9975 | 0.9927 | 0.9945 | 0.9979 |
| 3 | 0.9702 | 0.9764 | 0.9816 | 0.9865 | 0.9981 | 0.9957 | 0.9985 | 0.9989 |
| 4 | 0.9491 | 0.9564 | 0.9720 | 0.9915 | 0.9957 | 0.9943 | 0.9981 | 0.9992 |
| 5 | 0.8069 | 0.9302 | 0.9375 | 0.9952 | 0.9853 | 0.9967 | 0.9990 | 0.9995 |
| 6 | 0.8630 | 0.9585 | 0.9706 | 0.9904 | 0.9963 | 0.9954 | 0.9990 | 0.9985 |
| 7 | 0.9863 | 0.9849 | 0.9762 | 0.9840 | 0.9936 | 0.9953 | 0.9972 | 0.9991 |
| 8 | 0.9822 | 0.9853 | 0.9792 | 0.9908 | 0.9982 | 0.9946 | 0.9974 | 0.9976 |
| 9 | 0.9014 | 0.9811 | 0.9789 | 0.9944 | 0.9967 | 0.9951 | 0.9992 | 0.9992 |
| 10 | 0.9028 | 0.9243 | 0.9756 | 0.9896 | 0.9893 | 0.9958 | 0.9950 | 0.9974 |
| 11 | 0.8981 | 0.8998 | 0.9788 | 0.9865 | 0.9958 | 0.9943 | 0.9986 | 0.9983 |
| 12 | 0.9086 | 0.9735 | 0.9936 | 0.9943 | 0.9958 | 0.9946 | 0.9988 | 0.9996 |
| 13 | 0.9847 | 0.9807 | 0.9895 | 0.9902 | 0.9961 | 0.9956 | 0.9988 | 0.9992 |
| 14 | 0.9466 | 0.9455 | 0.9659 | 0.9892 | 0.9923 | 0.9980 | 0.9992 | 0.9995 |
| 15 | 0.9564 | 0.9521 | 0.9901 | 0.9903 | 0.9979 | 0.9921 | 0.9991 | 0.9992 |
| 16 | 0.9569 | 0.9841 | 0.9832 | 0.9832 | 0.9985 | 0.9954 | 0.9990 | 0.9994 |
| 17 | 0.9711 | 0.9402 | 0.9895 | 0.9915 | 0.9911 | 0.9946 | 0.9985 | 0.9993 |
| 18 | 0.9429 | 0.9827 | 0.9873 | 0.9921 | 0.9932 | 0.9945 | 0.9980 | 0.9990 |
| 19 | 0.9786 | 0.9911 | 0.9896 | 0.9785 | 0.9894 | 0.9936 | 0.9987 | 0.9996 |
| 20 | 0.9739 | 0.9471 | 0.9611 | 0.9808 | 0.9863 | 0.9959 | 0.9936 | 0.9976 |
| 21 | 0.9589 | 0.9680 | 0.9742 | 0.9870 | 0.9858 | 0.9941 | 0.9968 | 0.9989 |
| 22 | 0.9289 | 0.9302 | 0.9679 | 0.9924 | 0.9957 | 0.9942 | 0.9990 | 0.9982 |
| 23 | 0.9235 | 0.9429 | 0.9786 | 0.9892 | 0.9948 | 0.9965 | 0.9987 | 0.9995 |
| 24 | 0.9435 | 0.9623 | 0.9831 | 0.9828 | 0.9967 | 0.9923 | 0.9989 | 0.9990 |
| 25 | 0.9845 | 0.9908 | 0.9887 | 0.9828 | 0.9909 | 0.9929 | 0.9976 | 0.9964 |
| 26 | 0.8654 | 0.9632 | 0.9583 | 0.9860 | 0.9925 | 0.9957 | 0.9987 | 0.9996 |
| 27 | 0.9559 | 0.9761 | 0.9755 | 0.9862 | 0.9979 | 0.9962 | 0.9994 | 0.9991 |
| 28 | 0.9615 | 0.9537 | 0.9788 | 0.9946 | 0.9957 | 0.9942 | 0.9993 | 0.9994 |
| 29 | 0.9756 | 0.9781 | 0.9906 | 0.9918 | 0.9955 | 0.9956 | 0.9992 | 0.9997 |
| 30 | 0.9752 | 0.9930 | 0.9928 | 0.9886 | 0.9966 | 0.9955 | 0.9994 | 0.9997 |
| 31 | 0.9685 | 0.9537 | 0.9794 | 0.9861 | 0.9979 | 0.9961 | 0.9990 | 0.9994 |
| 32 | 0.9584 | 0.9345 | 0.9476 | 0.9877 | 0.9947 | 0.9939 | 0.9976 | 0.9989 |
| 33 | 0.8949 | 0.9586 | 0.9787 | 0.9883 | 0.9920 | 0.9937 | 0.9974 | 0.9968 |
| 34 | 0.9729 | 0.8900 | 0.9563 | 0.9963 | 0.9864 | 0.9957 | 0.9995 | 0.9985 |
| 35 | 0.9922 | 0.9788 | 0.9828 | 0.9963 | 0.9937 | 0.9960 | 0.9988 | 0.9991 |
| 36 | 0.9793 | 0.9675 | 0.9941 | 0.9858 | 0.9959 | 0.9941 | 0.9991 | 0.9994 |
| 37 | 0.8762 | 0.9271 | 0.9752 | 0.9834 | 0.9924 | 0.9927 | 0.9985 | 0.9983 |
| 38 | 0.9305 | 0.9795 | 0.9785 | 0.9937 | 0.9920 | 0.9953 | 0.9980 | 0.9997 |
| 39 | 0.9777 | 0.9832 | 0.9939 | 0.9879 | 0.9971 | 0.9930 | 0.9988 | 0.9995 |
| 40 | 0.9821 | 0.9924 | 0.9829 | 0.9917 | 0.9931 | 0.9981 | 0.9951 | 0.9983 |
| 41 | 0.9812 | 0.9356 | 0.9901 | 0.9839 | 0.9959 | 0.9936 | 0.9989 | 0.9990 |
| 42 | 0.9653 | 0.9859 | 0.9832 | 0.9902 | 0.9960 | 0.9936 | 0.9990 | 0.9980 |
| 43 | 0.9391 | 0.9552 | 0.9782 | 0.9919 | 0.9977 | 0.9950 | 0.9980 | 0.9987 |
| 44 | 0.9757 | 0.9915 | 0.9917 | 0.9913 | 0.9973 | 0.9945 | 0.9979 | 0.9989 |
| 45 | 0.9953 | 0.9916 | 0.9892 | 0.9909 | 0.9936 | 0.9931 | 0.9978 | 0.9990 |
| 46 | 0.8646 | 0.9580 | 0.9623 | 0.9961 | 0.9957 | 0.9936 | 0.9992 | 0.9998 |
| 47 | 0.9281 | 0.9804 | 0.9848 | 0.9970 | 0.9903 | 0.9955 | 0.9986 | 0.9988 |
| 48 | 0.9607 | 0.9780 | 0.9684 | 0.9901 | 0.9862 | 0.9967 | 0.9990 | 0.9993 |

3.8. Serra do Mar – correlation values

Table S.9. Serra do Mar area. Correlation values for each set of n random points.

| run | 50 | 100 | 250 | 500 | 1 000 | 2 500 | 5 000 | 10 000 |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|
| 0 | 0.9735 | 0.9878 | 0.9894 | 0.9975 | 0.9981 | 0.9987 | 0.9993 | 0.9980 |
| 1 | 0.9415 | 0.9374 | 0.9719 | 0.9891 | 0.9965 | 0.9986 | 0.9986 | 0.9971 |
| 2 | 0.9708 | 0.9721 | 0.9878 | 0.9977 | 0.9942 | 0.9982 | 0.9993 | 0.9998 |
| 3 | 0.9845 | 0.9677 | 0.9759 | 0.9794 | 0.9900 | 0.9949 | 0.9990 | 0.9980 |
| 4 | 0.9878 | 0.9803 | 0.9859 | 0.9979 | 0.9969 | 0.9947 | 0.9984 | 0.9999 |
| 5 | 0.9785 | 0.9841 | 0.9897 | 0.9877 | 0.9959 | 0.9993 | 0.9995 | 0.9992 |
| 6 | 0.9924 | 0.9557 | 0.9664 | 0.9784 | 0.9863 | 0.9961 | 0.9983 | 0.9983 |
| 7 | 0.8933 | 0.9464 | 0.9914 | 0.9955 | 0.9978 | 0.9989 | 0.9995 | 0.9998 |
| 8 | 0.9771 | 0.9868 | 0.9938 | 0.9927 | 0.9964 | 0.9953 | 0.9989 | 0.9983 |
| 9 | 0.9861 | 0.9586 | 0.9943 | 0.9978 | 0.9974 | 0.9976 | 0.9980 | 0.9991 |
| 10 | 0.9822 | 0.9942 | 0.9920 | 0.9947 | 0.9950 | 0.9946 | 0.9964 | 0.9982 |
| 11 | 0.9815 | 0.9902 | 0.9896 | 0.9955 | 0.9985 | 0.9962 | 0.9974 | 0.9996 |
| 12 | 0.9613 | 0.9890 | 0.9967 | 0.9927 | 0.9961 | 0.9943 | 0.9993 | 0.9998 |
| 13 | 0.9755 | 0.9727 | 0.9900 | 0.9963 | 0.9972 | 0.9993 | 0.9996 | 0.9993 |
| 14 | 0.9655 | 0.9716 | 0.9823 | 0.9888 | 0.9960 | 0.9985 | 0.9995 | 0.9982 |
| 15 | 0.9722 | 0.9702 | 0.9774 | 0.9938 | 0.9978 | 0.9974 | 0.9995 | 0.9997 |
| 16 | 0.9879 | 0.9845 | 0.9930 | 0.9974 | 0.9981 | 0.9963 | 0.9982 | 0.9987 |
| 17 | 0.9761 | 0.9525 | 0.9892 | 0.9938 | 0.9985 | 0.9974 | 0.9987 | 0.9993 |
| 18 | 0.9327 | 0.9656 | 0.9818 | 0.9890 | 0.9932 | 0.9978 | 0.9992 | 0.9995 |
| 19 | 0.8701 | 0.9705 | 0.9889 | 0.9966 | 0.9974 | 0.9995 | 0.9998 | 0.9976 |
| 20 | 0.9755 | 0.9870 | 0.9918 | 0.9967 | 0.9956 | 0.9979 | 0.9983 | 0.9977 |
| 21 | 0.9869 | 0.9814 | 0.9933 | 0.9952 | 0.9979 | 0.9966 | 0.9984 | 0.9998 |
| 22 | 0.9763 | 0.9816 | 0.9904 | 0.9977 | 0.9952 | 0.9981 | 0.9994 | 0.9996 |
| 23 | 0.9226 | 0.9746 | 0.9830 | 0.9945 | 0.9946 | 0.9979 | 0.9983 | 0.9981 |
| 24 | 0.9731 | 0.9860 | 0.9865 | 0.9939 | 0.9925 | 0.9953 | 0.9990 | 0.9997 |
| 25 | 0.9885 | 0.9712 | 0.9892 | 0.9961 | 0.9940 | 0.9943 | 0.9969 | 0.9993 |
| 26 | 0.9485 | 0.9607 | 0.9804 | 0.9969 | 0.9972 | 0.9975 | 0.9986 | 0.9988 |
| 27 | 0.9752 | 0.9861 | 0.9924 | 0.9937 | 0.9975 | 0.9993 | 0.9994 | 0.9988 |
| 28 | 0.9605 | 0.9689 | 0.9860 | 0.9889 | 0.9973 | 0.9990 | 0.9990 | 0.9995 |
| 29 | 0.9831 | 0.9926 | 0.9926 | 0.9895 | 0.9932 | 0.9980 | 0.9997 | 0.9992 |
| 30 | 0.9667 | 0.9789 | 0.9872 | 0.9957 | 0.9940 | 0.9933 | 0.9955 | 0.9995 |
| 31 | 0.9313 | 0.9544 | 0.9760 | 0.9922 | 0.9977 | 0.9979 | 0.9998 | 0.9999 |
| 32 | 0.9517 | 0.9781 | 0.9926 | 0.9948 | 0.9932 | 0.9992 | 0.9995 | 0.9995 |
| 33 | 0.9374 | 0.9508 | 0.9752 | 0.9930 | 0.9977 | 0.9967 | 0.9975 | 0.9987 |
| 34 | 0.9304 | 0.9751 | 0.9977 | 0.9960 | 0.9988 | 0.9984 | 0.9978 | 0.9989 |
| 35 | 0.9678 | 0.9662 | 0.9793 | 0.9871 | 0.9940 | 0.9989 | 0.9995 | 0.9970 |
| 36 | 0.9886 | 0.9796 | 0.9922 | 0.9952 | 0.9952 | 0.9996 | 0.9986 | 0.9989 |
| 37 | 0.9320 | 0.9414 | 0.9887 | 0.9937 | 0.9943 | 0.9965 | 0.9995 | 0.9976 |
| 38 | 0.9772 | 0.9842 | 0.9897 | 0.9880 | 0.9953 | 0.9985 | 0.9993 | 0.9980 |
| 39 | 0.9785 | 0.9854 | 0.9901 | 0.9960 | 0.9972 | 0.9988 | 0.9990 | 0.9970 |
| 40 | 0.9507 | 0.9626 | 0.9860 | 0.9918 | 0.9975 | 0.9961 | 0.9979 | 0.9980 |
| 41 | 0.9802 | 0.9716 | 0.9801 | 0.9917 | 0.9976 | 0.9980 | 0.9992 | 0.9997 |
| 42 | 0.9641 | 0.9780 | 0.9889 | 0.9887 | 0.9972 | 0.9994 | 0.9998 | 0.9995 |
| 43 | 0.9870 | 0.9895 | 0.9846 | 0.9952 | 0.9966 | 0.9946 | 0.9968 | 0.9989 |
| 44 | 0.9704 | 0.9713 | 0.9774 | 0.9774 | 0.9930 | 0.9989 | 0.9997 | 0.9996 |
| 45 | 0.9704 | 0.9826 | 0.9756 | 0.9943 | 0.9974 | 0.9988 | 0.9985 | 0.9984 |
| 46 | 0.9867 | 0.9769 | 0.9861 | 0.9898 | 0.9913 | 0.9984 | 0.9991 | 0.9989 |
| 47 | 0.9719 | 0.9768 | 0.9944 | 0.9980 | 0.9981 | 0.9975 | 0.9994 | 0.9997 |
| 48 | 0.9705 | 0.9816 | 0.9890 | 0.9953 | 0.9952 | 0.9979 | 0.9958 | 0.9995 |

3.9. Plots of correlation values and 4PL logistic regressions

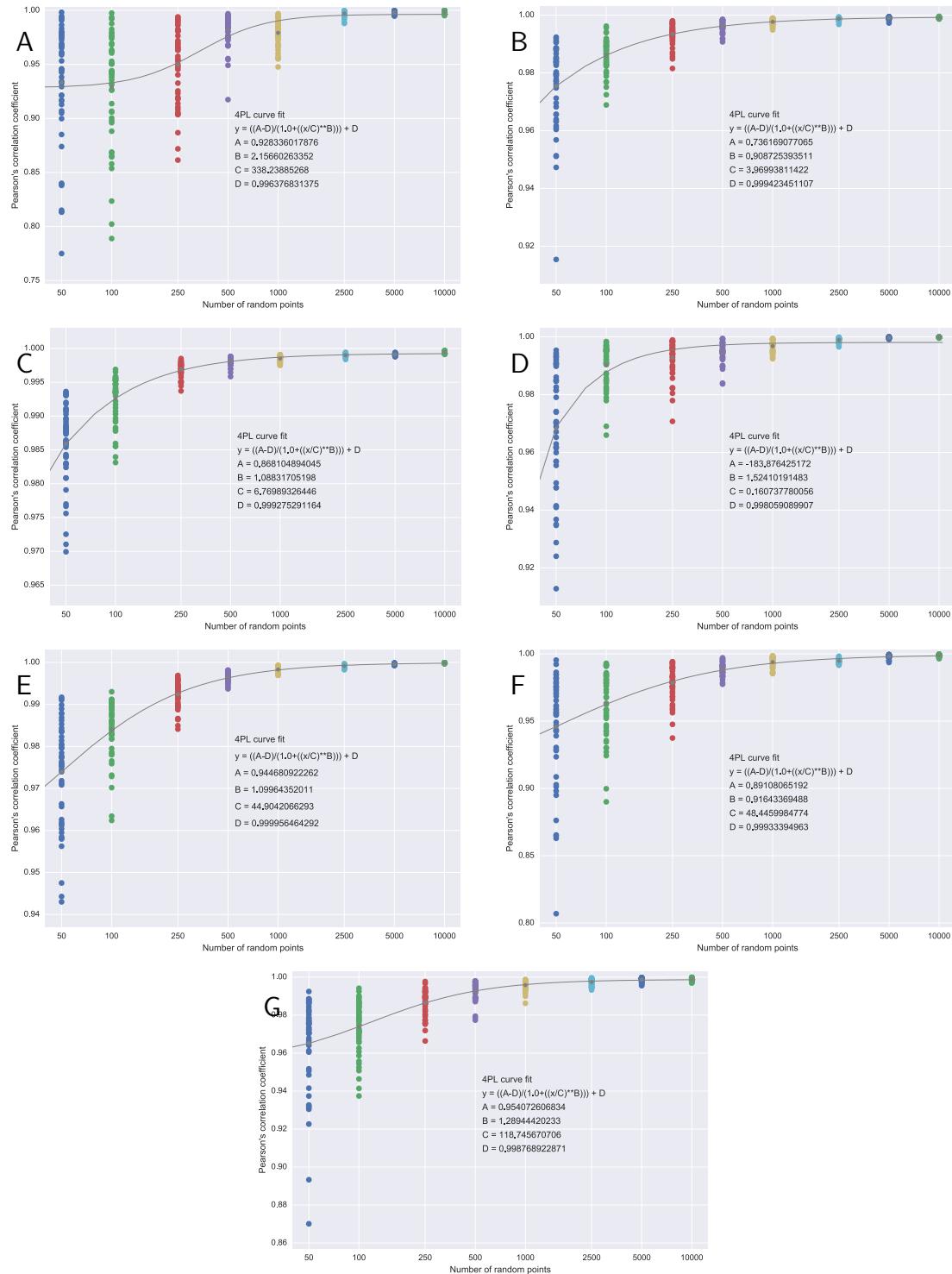


Figure S.3.1. Plots of correlation values and 4PL logistic regressions for each study area. A) Aracá; B) Barcelos; C) Pantanal; D) Iporanga; E) Rio Claro; F) Santa Catarina; G) Serra do Mar.

4. Summary statistics of analysed DEMs (10 000 random points)

Table S.10. Summary statistics of elevation - Aracá area (data file: Araca_randon_10000.csv)

| stats | min | max | range | mean | median | stddev | skew | kurt | p25 | p75 |
|---------------|-------|---------|---------|--------|--------|--------|------|-------|-------|-------|
| tdx12 | 5.77 | 1635.76 | 1629.99 | 108.89 | 51.72 | 213.98 | 4.02 | 15.69 | 40.45 | 66.31 |
| tdx30 | 19.11 | 1634.71 | 1615.60 | 108.89 | 51.61 | 213.94 | 4.02 | 15.69 | 40.50 | 66.44 |
| srtm30_egm96 | 25.00 | 1644.00 | 1619.00 | 115.68 | 58.00 | 213.29 | 4.04 | 15.90 | 48.00 | 74.00 |
| srtm30_wgs84 | 18.38 | 1637.08 | 1618.70 | 109.40 | 52.39 | 213.14 | 4.05 | 15.91 | 41.86 | 67.77 |
| aster30_egm96 | 2.00 | 2684.00 | 2682.00 | 111.37 | 55.00 | 214.51 | 4.16 | 17.92 | 43.00 | 70.00 |
| aster30_wgs84 | -3.72 | 2677.16 | 2680.88 | 105.09 | 49.12 | 214.36 | 4.16 | 17.94 | 37.02 | 64.38 |
| aw3d30_egm96 | 20.00 | 1310.00 | 1290.00 | 88.97 | 60.00 | 153.44 | 6.13 | 38.31 | 50.00 | 73.00 |
| aw3d30_wgs84 | 12.76 | 1303.20 | 1290.44 | 82.89 | 53.89 | 153.34 | 6.13 | 38.32 | 44.02 | 67.37 |

Table S.11. Summary statistics of elevation - Barcelos area (data file: Barcelos_randon_10000.csv)

| stats | min | max | range | mean | median | stddev | skew | kurt | p25 | p75 |
|---------------|-------|--------|--------|-------|--------|--------|-------|-------|-------|-------|
| tdx12 | 0.06 | 73.79 | 73.74 | 37.02 | 40.51 | 10.47 | -0.62 | -0.69 | 28.50 | 45.43 |
| tdx30 | 0.17 | 67.30 | 67.14 | 36.97 | 40.63 | 10.40 | -0.66 | -0.69 | 28.49 | 45.45 |
| srtm30_egm96 | 12.00 | 68.00 | 56.00 | 44.52 | 48.00 | 10.54 | -0.69 | -0.59 | 37.00 | 53.00 |
| srtm30_wgs84 | 4.63 | 61.66 | 57.03 | 37.46 | 40.68 | 10.28 | -0.68 | -0.55 | 29.96 | 45.54 |
| aster30_egm96 | 0.00 | 111.00 | 111.00 | 46.26 | 48.00 | 12.72 | -0.13 | 0.40 | 38.00 | 55.00 |
| aster30_wgs84 | -6.11 | 104.19 | 110.31 | 39.20 | 40.58 | 12.66 | -0.09 | 0.47 | 31.09 | 47.33 |
| aw3d30_egm96 | 6.00 | 110.00 | 104.00 | 45.22 | 49.00 | 10.60 | -0.71 | -0.35 | 38.00 | 54.00 |
| aw3d30_wgs84 | -2.05 | 102.12 | 104.17 | 38.08 | 41.83 | 10.32 | -0.70 | -0.25 | 30.81 | 46.11 |

Table S.12. Summary statistics of elevation - Pantanal area (data file: Pantanal_randon_10000.csv)

| stats | min | max | range | mean | median | stddev | skew | kurt | p25 | p75 |
|---------------|--------|--------|-------|--------|--------|--------|------|-------|--------|--------|
| tdx12 | 97.11 | 150.97 | 53.87 | 122.16 | 121.80 | 9.58 | 0.15 | -0.88 | 114.27 | 129.69 |
| tdx30 | 101.67 | 149.54 | 47.87 | 122.15 | 121.79 | 9.49 | 0.14 | -0.91 | 114.22 | 129.67 |
| srtm30_egm96 | 91.00 | 147.00 | 56.00 | 116.12 | 115.00 | 11.06 | 0.15 | -0.84 | 107.00 | 125.00 |
| srtm30_wgs84 | 102.95 | 154.29 | 51.34 | 125.54 | 124.90 | 9.94 | 0.16 | -0.81 | 117.48 | 133.21 |
| aster30_egm96 | 86.00 | 160.00 | 74.00 | 115.79 | 115.00 | 11.63 | 0.19 | -0.63 | 107.00 | 124.00 |
| aster30_wgs84 | 97.51 | 170.29 | 72.78 | 125.21 | 124.88 | 10.58 | 0.21 | -0.56 | 116.91 | 132.83 |
| aw3d30_egm96 | 71.00 | 146.00 | 75.00 | 116.33 | 115.00 | 10.92 | 0.14 | -0.89 | 108.00 | 125.00 |
| aw3d30_wgs84 | 81.14 | 153.08 | 71.94 | 125.75 | 125.01 | 9.80 | 0.15 | -0.86 | 118.04 | 133.61 |

Table S.13. Summary statistics of elevation - Iporanga area (data file: Iporanga_randon_10000.csv)

| stats | min | max | range | mean | median | stddev | skew | kurt | p25 | p75 |
|---------------|------|---------|---------|--------|--------|--------|-------|-------|--------|--------|
| tdx12 | 4.32 | 1214.60 | 1210.29 | 584.54 | 684.02 | 296.57 | -0.49 | -1.11 | 312.65 | 827.84 |
| tdx30 | 3.13 | 1201.04 | 1197.91 | 584.49 | 683.80 | 296.50 | -0.49 | -1.11 | 312.34 | 827.23 |
| srtm30_egm96 | 3.00 | 1209.00 | 1206.00 | 586.85 | 687.00 | 296.14 | -0.49 | -1.12 | 315.00 | 830.00 |
| srtm30_wgs84 | 2.91 | 1209.24 | 1206.33 | 586.83 | 686.57 | 296.15 | -0.49 | -1.11 | 314.93 | 829.54 |
| aster30_egm96 | 6.00 | 1213.00 | 1207.00 | 582.95 | 683.00 | 296.05 | -0.49 | -1.13 | 310.00 | 827.00 |
| aster30_wgs84 | 5.91 | 1213.24 | 1207.33 | 582.93 | 683.28 | 296.06 | -0.49 | -1.12 | 309.98 | 826.81 |
| aw3d30_egm96 | 7.00 | 1221.00 | 1214.00 | 609.43 | 710.00 | 292.36 | -0.62 | -0.96 | 353.00 | 841.00 |
| aw3d30_wgs84 | 6.91 | 1221.22 | 1214.31 | 609.40 | 709.97 | 292.36 | -0.62 | -0.96 | 353.26 | 840.60 |

Table S.14. Summary statistics of elevation - Rio Claro area (data file: RioClaro_randon_10000.csv)

| stats | min | max | range | mean | median | stddev | skew | kurt | p25 | p75 |
|---------------|--------|---------|--------|--------|--------|--------|------|------|--------|--------|
| tdx12 | 434.09 | 1030.30 | 596.21 | 626.20 | 608.91 | 98.81 | 1.10 | 1.44 | 563.20 | 665.75 |
| tdx30 | 438.02 | 1029.46 | 591.44 | 626.18 | 608.99 | 98.82 | 1.10 | 1.44 | 563.27 | 665.43 |
| srtm30_egm96 | 451.00 | 1039.00 | 588.00 | 634.77 | 617.00 | 98.95 | 1.10 | 1.45 | 571.00 | 674.00 |
| srtm30_wgs84 | 447.27 | 1034.98 | 587.70 | 631.04 | 613.84 | 98.65 | 1.11 | 1.46 | 567.90 | 670.11 |
| aster30_egm96 | 443.00 | 1043.00 | 600.00 | 633.58 | 615.00 | 99.69 | 1.15 | 1.48 | 570.00 | 671.00 |
| aster30_wgs84 | 439.31 | 1038.98 | 599.66 | 629.85 | 611.19 | 99.38 | 1.15 | 1.49 | 566.09 | 667.52 |
| aw3d30_egm96 | 447.00 | 1041.00 | 594.00 | 634.71 | 617.00 | 98.87 | 1.10 | 1.43 | 571.00 | 675.00 |
| aw3d30_wgs84 | 443.76 | 1036.94 | 593.18 | 630.98 | 613.86 | 98.57 | 1.10 | 1.44 | 568.01 | 670.90 |

Table S.15. Summary statistics of elevation - Santa Catarina area (data file: SantaCatarina_randon_10000.csv)

| stats | min | max | range | mean | median | stddev | skew | kurt | p25 | p75 |
|---------------|------|---------|---------|--------|--------|--------|------|------|-------|--------|
| tdx12 | 0.04 | 1248.33 | 1248.29 | 253.11 | 162.09 | 263.13 | 1.09 | 0.37 | 26.55 | 410.35 |
| tdx30 | 0.23 | 1242.74 | 1242.51 | 252.89 | 160.91 | 263.13 | 1.09 | 0.36 | 26.44 | 410.36 |
| srtm30_egm96 | 1.00 | 1241.00 | 1240.00 | 253.21 | 163.00 | 262.66 | 1.09 | 0.36 | 27.00 | 409.75 |
| srtm30_wgs84 | 2.69 | 1243.55 | 1240.86 | 255.55 | 165.39 | 262.79 | 1.09 | 0.36 | 29.40 | 412.17 |
| aster30_egm96 | 1.00 | 1227.00 | 1226.00 | 249.45 | 157.00 | 259.87 | 1.11 | 0.41 | 25.00 | 401.00 |
| aster30_wgs84 | 2.75 | 1229.53 | 1226.78 | 251.79 | 159.74 | 259.99 | 1.11 | 0.41 | 27.52 | 403.57 |
| aw3d30_egm96 | 1.00 | 1246.00 | 1245.00 | 258.50 | 172.00 | 264.31 | 1.06 | 0.29 | 29.00 | 419.00 |
| aw3d30_wgs84 | 2.73 | 1248.55 | 1245.82 | 260.85 | 173.96 | 264.44 | 1.06 | 0.29 | 31.41 | 421.60 |

Table S.16. Summary statistics of elevation - Serra do Mar area (data file: SerraMar_randon_10000.csv)

| stats | min | max | range | mean | median | stddev | skew | kurt | p25 | p75 |
|---------------|-------|---------|---------|--------|--------|--------|------|-------|--------|---------|
| tdx12 | 0.19 | 2631.81 | 2631.62 | 893.85 | 875.75 | 466.10 | 0.45 | -0.12 | 528.41 | 1206.46 |
| tdx30 | 0.00 | 2628.64 | 2628.64 | 894.73 | 877.39 | 465.57 | 0.46 | -0.12 | 529.16 | 1207.95 |
| srtm30_egm96 | 1.00 | 2639.00 | 2638.00 | 894.09 | 874.00 | 469.12 | 0.43 | -0.13 | 532.00 | 1210.75 |
| srtm30_wgs84 | -3.96 | 2634.67 | 2638.63 | 889.52 | 869.91 | 469.18 | 0.43 | -0.13 | 527.33 | 1205.92 |
| aster30_egm96 | 5.00 | 2627.00 | 2622.00 | 890.11 | 872.00 | 466.02 | 0.44 | -0.13 | 528.00 | 1205.25 |
| aster30_wgs84 | 0.61 | 2622.67 | 2622.06 | 885.53 | 867.75 | 466.08 | 0.44 | -0.13 | 523.35 | 1200.70 |
| aw3d30_egm96 | 1.00 | 2636.00 | 2635.00 | 895.92 | 879.00 | 469.58 | 0.43 | -0.14 | 532.00 | 1212.00 |
| aw3d30_wgs84 | -3.71 | 2631.67 | 2635.38 | 891.35 | 874.74 | 469.64 | 0.43 | -0.14 | 527.69 | 1207.64 |