CORRECTION



Correction to: Important drivers of East African monsoon variability and improving rainy season onset prediction

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Correction to: Natural Hazards (2024) 120:429-445

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This is regarding our earlier publication (Roy, Mliwa and Troccoli 2023a), where we used El Niño Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) data.

In the manuscript, Data and Methodology part (2nd para), we did not include the **date of** access of data and would like to mention the access date as follows:

Data Niño3.4: https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/nino34.long.anom.data, accessed 30/09/22.

Data IOD. https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/dmi.had.long.data, accessed 30/09/22.

This is because the data of ENSO as represented by Nino3.4 index¹, though did not change, but the data of IOD has changed. A poster was presented at European Geosciences Union (EGU) 2023 conference on 25th April (Roy, Troccoli, Mliwa 2023b) describing the main findings of this paper and now we find that IOD data was changed on 26th April 2023. Both the old IOD data² and new IOD data³ are mentioned here for verification. Based on the new data, IOD phases have changed in many months and that is likely to affect our results. Hence, we would like to **add the date of access** in the correction of this paper including two sets of IOD data (the used data of IOD in this paper is in the Appendix, also in the Supplementary file). A subsequent follow-up paper (Roy and Troccoli, 2024), however took additional attention and mentioned the date of access of IOD data as on 30/09/22.

The original article can be found online at https://doi.org/10.1007/s11069-023-06223-3.

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¹ Data Niño3.4: https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/nino34.long.anom.data, accessed 30/09/22.

² Data IOD: https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/dmi.had.long.data, accessed 30/09/22. [see the used data in the Appendix and in the Supplementary file].

Data IOD: https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/dmi.had.long.data, accessed 13/01/24.

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Appendix: The used IOD Data Link: https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/dmi.had.long.data, accessed on 30.09.22 (valid till 25th April 2023)

2022 -0.373 -0.256 0.277 0.027 -0.4 -0.434 -0.554 -0.409 -0.622 -0.476 -0.278 -0.306 1870 -0.208 -0.09 -0.112 -0.073 -0.035 -0.049 -0.347 -0.263 -0.23 -0.368 -0.094 -0.159 1871 1872 0.028 0.121 0.024 -0.009 -0.069 0.03 -0.189 -0.213 -0.227 -0.111 0.017 -0.041 1873 0.127 -0.239 -0.304 -0.196 -0.331 -0.473 -0.593 -0.688 -0.588 -0.319 -0.229 -0.233 -0.316 -0.308 -0.486 -0.678 -0.361 -0.351 -0.242 -0.232 -0.708 -0.999 -0.48 -0.72 -0.384 -0.107 0.002 0.105 -0.055 0.02 -0.414 -0.135 -0.291 -0.499 -0.767 -0.39 -0.295 -0.424 -0.302 -0.401 -0.392 -0.31 -0.294 -0.155 0.027 -0.053 -0.235 -0.227 1877 -0.246 0.447 0.23 -0.205 -0.605 -0.376 -0.491 0.326 0.626 0.577 0.681 0.224 1878 -0.196 -0.318 0.084 -0.01 -0.275 -0.197 -0.286 -0.16 -0.102 -0.515 -0.338 -0.401 1879 -0.364 -0.337 -0.352 -0.466 -0.433 -0.16 -0.278 -0.528 -0.485 -0.629 -0.638 -0.536 1880 -0.398 -0.182 -0.227 0.077 -0.06 -0.186 -0.431 -0.474 -0.468 -0.596 -0.43 -0.278 1881 1882 -0.492 -0.6 -0.049 -0.058 0.012 0.042 -0.136 -0.384 -0.546 -0.35 -0.254 -0.361 -0.64 -0.127 -0.203 -0.051 -0.11 0.03 -0.191 -0.012 -0.396 -0.188 -0.236 -0.255 1885 -0.398 -0.01 -0.069 -0.123 -0.12 -0.016 -0.121 -0.117 -0.245 -0.059 -0.352 -0.315 1886 -0.548 -0.686 -0.355 -0.207 -0.366 -0.233 -0.628 -0.806 -0.882 -0.738 -0.561 -0.49 -0.394 -0.31 -0.182 -0.183 -0.212 -0.058 -0.135 0.103 -0.179 -0.357 -0.166 -0.226 1887 -0.274 -0.523 -0.633 -0.787 -0.424 -0.311 -0.352 -0.258 -0.42 -0.277 -0.43 -0.383 1888 -0.598 -0.166 -0.553 -0.742 -0.584 -0.448 -0.419 -0.552 -0.806 -0.98 -0.747 -0.341 1889 1890 1891 -0.254 -0.493 -0.511 -0.211 -0.245 0.014 -0.205 0.106 0.038 0.043 -0.007 0.138 -0.168 -0.243 -0.108 -0.243 -0.206 -0.373 -0.562 -0.929 -1.075 -0.655 -0.331 -0.427 -0.38 -0.389 -0.313 -0.507 -0.443 -0.413 -0.452 -0.645 -0.586 -0.637 -0.394 -0.295 1893 -0.012 -0.181 -0.163 -0.241 -0.134 0.019 -0.083 0.237 -0.223 -0.166 -0.152 -0.182 1895 -0.118 0.023 -0.008 -0.102 -0.077 0.009 -0.314 0.041 -0.2 0.004 -0.358 -0.302 -0.321 -0.507 -0.462 -0.217 -0.137 -0.042 -0.004 -0.02 0.094 0.461 0.163 0.167 1896 -0.118 -0.234 -0.183 -0.102 -0.104 -0.139 -0.148 -0.108 -0.454 -0.965 -0.781 -0.675 1897 1898 -0.484 -0.366 -0.231 -0.303 -0.414 -0.319 -0.726 -0.706 -0.783 -0.756 -0.538 -0.403 1899 -0.353 -0.213 -0.076 -0.054 -0.011 -0.262 -0.477 -0.34 -0.828 -0.268 -0.314 -0.674 1900 -0.475 -0.788 -0.62 -0.438 -0.473 -0.504 -0.616 -0.712 -0.923 -0.615 -0.618 -0.611 1901 -0.408 -0.373 -0.151 0.127 0.038 0.024 0.027 0.445 0.315 -0.078 0.076 -0.196 1902 -0.414 -0.491 -0.264 -0.553 -0.187 -0.221 -0.518 -0.339 -0.584 -0.876 -0.505 -0.372 1904 -0.154 -0.154 -0.119 0.046 -0.179 -0.172 -0.19 -0.301 -0.572 -0.077 -0.229 -0.574 -0.536 -0.292 -0.372 -0.393 -0.125 -0.334 -0.178 -0.108 0.13 -0.302 -0.313 -0.49 1905 -0.54 -0.405 -0.41 -0.712 -0.345 -0.276 -0.889 -0.973 -1.528 -0.852 -0.671 -0.28 1906 -0.304 -0.105 0.049 -0.291 -0.228 -0.232 -0.505 -0.821 -0.42 -0.244 -0.265 -0.151 1907 -0.327 -0.27 -0.151 -0.713 -0.15 0.155 -0.501 -0.348 -0.212 -0.309 -0.384 -0.513 1908 1909 -0.667 -0.421 -0.459 -0.369 -0.722 -0.804 -0.935 -0.874 -0.813 -0.57 -0.301 -0.187 -0.486 -0.089 -0.389 -0.319 -0.451 -0.346 -0.939 -0.708 -0.916 -0.893 -0.559 -0.226 1910 1911 -0.129 -0.406 -0.635 -0.668 -0.356 -0.7 -0.677 -0.474 -0.438 -0.509 -0.106 -0.084 -0.187 -0.222 0.048 -0.182 0.018 0.111 -0.576 -0.654 -0.619 -0.449 -0.611 -0.433 1913 -0.171 -0.056 -0.035 -0.191 -0.107 0.215 -0.241 -0.37 -0.362 0.025 -0.117 -0.179 -0.222 -0.092 -0.253 -0.163 -0.026 0.667 0.199 0.089 0.04 0.102 -0.434 -0.642 1915 -0.564 -0.608 -0.302 -0.205 -0.416 -0.089 -0.608 -0.328 -0.271 -0.156 -0.104 0.043 1916 -0.065 0.049 0.158 0.213 -0.077 -0.284 -0.589 -0.74 -1.162 -0.81 -0.583 -0.21 1917 1918 0.039 -0.037 -0.17 -0.332 -0.32 -0.243 -0.079 -0.207 -0.114 -0.189 -0.139 -0.337 1920 0.083 0.134 0.239 0.133 0.349 0.056 -0.493 -0.489 -0.503 -0.287 -0.454 -0.318 -0.231 -0.085 0.019 -0.114 0.038 -0.1 -0.344 -0.819 -0.442 -0.314 -0.361 -0.313 -0.317 -0.116 0.179 -0.314 -0.296 0.046 -0.452 -0.302 -0.405 -0.369 -0.424 -0.235 1922 -0.139 -0.334 -0.182 -0.163 -0.232 0.012 -0.306 0.112 0.347 0.435 0.571 -0.133 1923 1924 -0.369 -0.517 -0.328 -0.191 -0.335 -0.333 -0.298 -0.305 -0.546 -0.049 -0.285 -0.295 -0.252 0.052 0.093 0.557 0.037 0.195 -0.071 0.072 0.495 0.263 0.241 -0.083 1925 1926 0.062 -0.279 0.059 -0.172 -0.005 0.26 -0.134 0.106 -0.299 0.044 -0.367 -0.352 1927 -0.136 0.122 -0.102 -0.323 -0.177 -0.054 -0.479 -0.499 -0.558 -0.442 -0.164 -0.308 -0.312 -0.28 -0.177 -0.238 -0.188 -0.352 -0.543 -0.779 -0.764 -0.573 -0.083 -0.303 -0.219 -0.282 -0.138 -0.147 -0.281 -0.133 -0.292 -0.375 -0.199 -0.196 -0.158 0.045 -0.357 -0.434 -0.22 -0.17 -0.365 -0.024 -0.308 -0.218 -0.696 -0.258 0.236 -0.044 0.008 -0.254 -0.448 -0.449 -0.178 -0.166 -0.316 -0.39 -0.904 -0.437 -0.061 -0.742 -0.338 -0.05 -0.298 -0.282 -0.149 -0.376 -0.297 -0.569 -0.191 0.037 -0.36 -0.5 1932 1933 -0.124 -0.012 0.139 0.253 -0.264 -0.193 -0.372 -0.518 -1.461 -0.826 -0.481 -0.402 1934 -0.545 -0.171 -0.065 -0.058 -0.12 0.098 -0.228 0.1 -0.391 -0.162 -0.032 -0.09 1935 0.073 0.025 0.219 -0.141 0.143 0.205 0.149 0.088 -0.141 -0.145 0.242 0.091 1936 0.151 -0.309 -0.111 0.007 -0.113 0.178 0.024 -0.325 -0.34 -0.532 0.06 -0.048 -0.151 -0.156 -0.327 0.122 -0.183 -0.45 -0.14 0.015 -0.144 0.008 -0.068 -0.019 -0.137 0.109 -0.27 0.096 -0.294 -0.524 -0.037 -0.352 -0.452 -0.589 -0.472 1940 0.145 -0.144 -0.376 -0.417 -0.38 0.085 -0.267 -0.141 -0.284 -0.312 -0.218 -0.246 -0.425 -0.168 -0.205 -0.15 -0.108 0.265 0.192 0.148 -0.542 -0.376 -0.265 -0.317 -0.089 0.327 -0.077 -0.166 0.363 0 1945 -0.075 0.169 0.305 -0.254 -0.492 -0.449 -0.427 -0.543 -0.488 -0.353 -0.2 -0.258



Table 1 (continued)

1946 0.133 0.066 -0.126 -0.482 0.377 -0.217 -0.062 0.277 0.034 -0.018 0.097 -0.18 -0.222 0.109 0.1 -0.111 0.184 0.047 -0.536 -0.547 -0.864 -0.664 -0.196 -0.196 -0.232 -0.075 0.125 -0.028 -0.005 0.173 -0.171 -0.35 -0.542 -0.133 -0.256 -0.437 0.093 0.257 -0.021 0.241 -0.011 0.104 0.088 0.123 0.016 0.035 -0.272 -0.261 1949 0.022 -0.474 -0.592 -0.399 -0.229 -0.38 -0.251 -0.107 -0.525 -0.431 -0.104 0.043 1950 1051 0.321 0.291 0.359 -0.438 -0.059 -0.076 -0.123 0.236 0.101 -0.008 0.246 -0.003 1952 -0.004 0.16 1955 0.016 -0.073 0.119 0.031 -0.616 -0.273 -0.342 -0.317 -0.632 -0.571 -0.146 -0.231 -0.036 0.059 0.099 -0.224 -0.491 -0.712 -0.986 -0.66 -0.697 -0.512 -0.393 -0.081 1956 -0.371 -0.484 -0.097 -0.225 -0.247 -0.351 -0.392 -0.154 -0.277 -0.363 -0.359 -0.18 1957 -0.331 -0.154 -0.274 -0.272 -0.417 -0.741 -0.966 -1.148 -1.197 -0.807 -0.551 -0.569 1958 1959 0.038 -0.452 -0.424 -0.281 -0.662 -0.632 -0.57 -0.8 -0.733 -0.427 -0.451 -0.287 1960 -0.171 0.036 -0.333 -0.67 -0.659 -0.567 -0.638 -0.472 -0.476 -0.747 -0.688 -0.572 1961 -0.079.0 -0.022 -0.537 -0.358 0.108 0.727 0.888 0.66 0.616 0.446 0.381 1962 -0.001 1963 0.394 0.475 0.301 0.014 -0.244 -0.134 0.308 0.585 0.187 0.591 0.442 0.011 1964 -0.396 -0.612 -0.212 -0.149 -0.44 -0.23 -0.732 -0.571 -0.875 -0.868 -0.161 -0.113 -0.266 -0.367 -0.086 -0.21 -0.46 -0.374 -0.376 -0.135 -0.091 0.177 -0.102 -0.22 1966 -0.167 -0.083 -0.241 -0.36 -0.343 -0.005 0.092 0.241 0.208 -0.145 -0.237 -0.167 1967 -0.171 0.007 0.348 -0.187 -0.086 0.158 0.236 0.243 0.251 0.318 0.146 0.123 1968 0.279 0.413 0.254 0.149 -0.044 0.205 -0.425 -0.343 -0.628 -0.372 -0.331 -0.144 1969 -0.097 -0.085 0.16 0.025 -0.086 -0.512 -0.31 -0.238 -0.142 -0.04 0.119 -0.016 0.363 0.405 0.168 0.294 0.262 -0.272 -0.473 -0.238 -0.494 -0.478 -0.184 -0.166 1970 1971 0.264 0.093 0.308 0.315 0.006 -0.123 -0.257 -0.435 -0.64 -0.469 0.141 0.284 -0.136 0.131 0.207 0.237 0.853 0.805 0.623 0.469 0.487 0.794 0.547 1972 0.209 1973 0.108 0.002 0.099 -0.041 0.164 -0.111 -0.399 -0.494 -0.667 -0.289 -0.034 0.117 1974 1975 -0.301 -0.17 -0.364 0.163 0.146 0.169 0.058 -0.232 -0.751 -0.896 -0.205 -0.1 1976 0.07 0.157 0.12 0.197 0.076 0.483 0.69 0.219 -0.102 -0.072 -0.058 0.098 1977 0.063 -0.181 0.274 0.046 -0.261 0.019 -0.074 -0.148 -0.153 0.404 -0.004 0.049 -0.574 -0.45 -0.482 -0.139 -0.453 -0.061 -0.01 -0.112 -0.155 -0.343 -0.335 -0.19 0.382 -0.078 0.066 -0.132 -0.364 0.222 -0.218 -0.114 -0.174 -0.154 -0.128 -0.032 1980 -0.093 -0.12 -0.317 -0.02 0.014 -0.268 -0.564 -0.71 -0.639 -0.498 -0.294 -0.413 1981 -0.136 0.056 0.127 0.168 0.062 -0.126 -0.463 -0.516 -0.651 -0.447 -0.204 0.05 1982 0.209 0.246 0.154 0.194 0.302 0.369 0.362 0.369 0.548 0.783 0.407 -0.093 1983 -0.416 -0.507 -0.652 -0.481 0.021 0.484 0.621 0.457 0.037 -0.128 -0.22 -0.031 -0.158 -0.069 -0.022 0.125 -0.225 -0.243 -0.269 -0.385 -0.502 -0.494 -0.295 -0.209 1984 -0.401 -0.547 -0.441 -0.125 -0.143 -0.516 -0.307 -0.346 -0.132 -0.339 0.197 -0.348 1985 1986 -0.047 -0.056 -0.1 -0.211 -0.074 -0.165 -0.449 -0.288 -0.036 0.111 -0.12 -0.205 -0.015 0.121 -0.037 -0.081 0.244 0.223 0.304 0.409 0.499 0.414 0.072 0.222 1987 1988 0.418 -0.074 -0.212 -0.053 -0.434 -0.158 -0.053 -0.177 -0.288 -0.365 -0.06 0.226 1989 -0.215 0.035 -0.219 -0.405 -0.515 -0.666 -0.35 -0.209 -0.119 -0.253 -0.215 -0.097 1990 -0.033 -0.209 -0.043 -0.31 -0.269 -0.455 -0.149 -0.279 -0.077 -0.186 0.029 0.073 0.131 -0.017 0.063 0.364 0.459 0.376 0.366 0.17 0.205 0.129 0.164 0.153 1991 1992 -0.256 -0.309 -0.571 -0.478 -0.47 -0.747 -0.382 -0.656 -0.727 -0.467 -0.276 -0.247 1993 -0.131 0.115 -0.195 -0.106 0.053 0.006 -0.055 -0.193 -0.064 0.004 -0.026 -0.136 1994 0.09 -0.066 0.302 0.426 0.624 0.546 0.654 0.923 0.635 0.867 0.41 1995 1996 0.045 0.047 0.015 -0.293 -0.186 -0.281 -0.546 -0.568 -0.606 -0.949 -0.674 -0.344 1997 -0.045 0.159 0.143 0.129 0.105 0.195 0.544 0.746 0.877 1.033 1.402 0.932 0.502 0.045 0.122 0.219 0.261 -0.288 -0.467 -0.39 -0.584 -0.53 -0.266 1998 0.59 -0.065 0.042 0.202 0.073 -0.106 -0.032 0.208 0.135 0.056 -0.03 0.007 -0.079 1999 2000 0.217 0.192 0.091 0.174 0.243 0.01 0.017 -0.183 -0.178 -0.06 0.071 0.24 2001 -0.366 0.063 0.09 0.212 0.217 0.241 -0.043 -0.189 -0.117 -0.291 -0.122 0.019 2002 -0.077 -0.018 0.108 -0.277 -0.249 -0.076 -0.164 -0.096 0.392 0.565 0.22 2003 -0.174 0.097 0.061 -0.024 -0.084 0.252 0.228 0.22 0.045 -0.084 -0.036 0.258 2004 0.109 0.194 0.177 -0.005 -0.485 -0.27 -0.204 -0.02 0 0.155 -0.03 -0.063 -0.058 -0.48 2005 2006 -0.07 -0.225 -0.126 0.06 -0.128 0.055 0.137 0.341 0.534 0.736 0.624 0.241 2007 0.29 0.23 0.216 0.175 0.349 0.144 0.141 0.349 0.341 0.227 0.1 2008 0.18 800.0 0.197 -0.078 0.258 0.329 0.343 0.237 0.192 0.188 -0.005 0.016 2009 0.097 0.243 0.2 0.201 0.336 0.214 -0.095 0.008 0.003 0.147 0.056 0.23 0.359 0.103 0.558 0.445 0.05 -0.026 0.096 0.051 -0.162 -0.277 -0.372 -0.142 2010 0.467 0.229 -0.01 0.169 0.319 0.457 0.308 0.516 0.459 -0.059 2011 0.257 0.322 2012 0.111 0.002 0.126 -0.196 -0.29 0.115 0.643 0.764 0.559 0.27 0.024 0.337 2013 0.001 0.269 0.183 -0.222 -0.426 -0.383 -0.083 -0.082 -0.204 -0.009 0.323 0.21 2014 -0.036 -0.009 -0.051 0.017 -0.012 0.086 -0.266 -0.26 -0.039 0.3 0.133 0.116 2015 -0.034 -0.265 -0.141 0.067 0.32 0.41 0.322 0.68 0.4 0.642 0.47 0.341 0.222 -0.034 -0.329 -0.661 -0.332 -0.331 -0.212 -0.259 -0.241 0.574 0.616 0.537 0.617 0.461 0.14 0.175 0.412 0.179 2016 0.331 -0.03 0.091 0.222 0.181 2017 -0.020.457 -0.008 0.202 0.269 0.15 2018 -0.135 0.295 -0.02 0.234 0.71 0.844 0.623 0.379 0.333 0.619 0.719 0.693 0.548 0.999 1.123 0.958 0.312 2019 0.452 0.496 0.325 2020 0.238 0.134 0.119 0.064 0.378 0.568 0.417 -0.07 -0.084 0.233 0.143 0.1 2021 2022 0.009 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999



Table 1 (continued)

DMI HadISST1.1

Created Fri Mar 25 08:39:11 MDT 2022

using SST anomaly 10S:10N, 50E-70E minus 10S:0, 90E-110E area averaged

Timeseries output created at NOAA PSL

https://psl.noaa/gov/data/timeseries/DMI

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11069-024-06551-y.

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Reference

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- Roy I, Troccoli A, Mliwa M (2023b) Major drivers of East African Monsoon variability and improved prediction for Onset dates. In: EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-17545. https://doi.org/10.5194/egusphere-egu23-17545.
- Roy, I and Troccoli, A (2024) Identifying important drivers of East African October to December rainfall season. Sci Total Environ (STOTEN), Elsevier, https://doi.org/10.1016/j.scitotenv.2023.169615.

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