JWARP> Vol.4 No.2, February 2012

OPEN ACCESS

Homogeneity and Trend Analysis of Hydrometeorological Data of the Eastern Black Sea Region, Turkey

PDF (Size:919KB) PP. 99-105 DOI: 10.4236/jwarp.2012.42012

Author(s)

Ebru Eris, Necati Agiralioglu

ABSTRACT

Eastern Black Sea Region in northeastern part of Turkey has the highest precipitation total in the country, approaching 2500 mm per a year. It is therefore an important region as it frequently encounters with flash floods due to heavy rains. For future planning of water resources, environment and urbanization, it is important to know the expected behavior of hydrometeorological processes, mainly precipitation and flow. Due to these facts, in this study, homogeneity of long-term annual precipitation and streamflow series of the Eastern Black Sea Region, Turkey is checked using double mass curve method and trends are determined by means of the Mann-Kendall test. The data network consists of 38 precipitation gauging stations and 40 flow gauging stations across the Eastern Black Sea Region. It is found that 27 precipitation stations out of 38 are homogeneous and no trend is available. Out of the remaining stations, nine are found non-homogeneous and four with trend. For annual flow data, it is found that 22 stations out of 40 are homogeneous and no trend is available. The remaining 18 stations are found non-homogeneous, among which 5 stations have trend at the same time.

KEYWORDS

Homogeneity; Trend Analysis; Double Mass Curve; Mann-Kendall Test; Eastern Black Sea Region; Turkey

Cite this paper

E. Eris and N. Agiralioglu, "Homogeneity and Trend Analysis of Hydrometeorological Data of the Eastern Black Sea Region, Turkey," *Journal of Water Resource and Protection*, Vol. 4 No. 2, 2012, pp. 99-105. doi: 10.4236/jwarp.2012.42012.

References

[1] IPCC, "Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the 3rd Assessment Report of the Intergovernmental Panel on Climate Change," Cambridge University Press, Cambridge, 2001.

[2] O. M. Gokturk, D. Bozkurt, O. L. Sen and M. Karaca, "Quality Control and Homogeneity of Turkish Precipitation Data," Hydrological Processes, Vol. 22, No. 16, 2008, pp. 3210-3218. doi:10.1002/hyp.6915

[3] S. Sahin and H. K. Cigizoglu, "Homogeneity Analysis of Turkish Meteorological Data Set," Hydrological Processes, Vol. 24, No. 8, 2010, pp. 981-992. doi:10.1002/hyp.7534

[4] M. Turkes, "Spatial and Temporal Analysis of Annual Rainfall Variations in Turkey," International Journal of Climatology, Vol. 16, No. 9, 1996, pp. 1057-1076. doi:10.1002/(SICI)1097-0088(199609)16:9<1057::AID-JOC75>3.0.CO;2-D

[5] T. Partal and E. Kahya, "Trend Analysis in Turkish Precipitation Data," Hydrological Processes, Vol. 20, No. 9, 2006, pp. 2011-2026. doi:10.1002/hyp.5993

[6] H. Aksoy, N. E. Unal, V. Alexandrov, S. Dakova and J. Yoon, "Hydrometeorological Analysis of Northwestern Turkey with Links to Climate Change," International Journal of Climatology, Vol. 28, No. 8, 2008, pp. 1047- 1060. doi:10.1002/joc.1599

- Open Special Issues
- Published Special Issues
- Special Issues Guideline

JWARP Subscription

Most popular papers in JWARP

About JWARP News

Frequently Asked Questions

Recommend to Peers

Recommend to Library

Contact Us

[7] M. Turkes, T. Koc and F. Saris, "Spatiotemporal Variability of Precipitation Total Series over Turkey," International Journal of Climatology, Vol. 29, No. 8, 2009, pp. 1056-1074. doi:10.1002/joc.1768

[8] F. Saris, D. M. Hannah and W. J. Eastwood, "Changes in Precipitation and River Flow in Northeast Turkey: Associations with the North Atlantic Oscillation," Proceedings of the 6th World FRIEND Conference, Fez, 25-29 October 2010, IAHS Publ.340.

[9] M. Turkes, U. M. Sumer and G. Kilic, "Variations and Trends in Annual Mean Air Temperatures in Turkey with Respect to Climatic Variability," International Journal of Climatology, Vol. 15, No. 5, 1995, pp. 557-569. doi:10.1002/joc.3370150507

[10] M. Kadioglu, "Trends in Surface Air Temperature Data Over Turkey," International Journal of Climatology, Vol. 17, No. 5, 1997, pp. 511-520. doi:10.1002/(SICI)1097-0088(199704) 17:5<511::AID-JOC130>3.0.CO;2-0

[11] M. Tayanc, H. N. Dalfes, M. Karaca and O. Yenigun, "A Comparative Assessment of Different Methods for Detecting Inhomogeneities in Turkish Temperature Data Set," International Journal of Climatology, Vol. 18, No. 5, 1998, pp. 561-578. doi:10.1002/(SICI)1097-0088(199804) 18:5<561::AID-JOC249>3.0.CO;2-Y

[12] M. Turkes, U. M. Sumer and G. Kilic, "Re-Evaluation of Trends Changes in Mean, Maximum and Minimum Temperatures of Turkey for the Period 1929-1999," International Journal of Climatology, Vol. 22, No. 8, 2002, pp. 947-977. doi:10.1002/joc.777

[13] B. Aksoy, "Variations and Trends in Global Solar Radiation for Turkey," Theoretical and Applied Climatology, Vol. 58, No. 1-2, 1997, pp. 71-77. doi:10.1007/BF00867433

[14] E. Kahya and S. Kalayci, "Trend Analysis of Streamflow in Turkey," Journal of Hydrology, Vol. 289, No. 1-4, 2004, pp. 128-144. doi:10.1016/j.jhydrol.2003.11.006

[15] H. K. Cigizoglu, M. Bayazit and B. Onoz, "Trends in the Maximum, Mean and Low Flows of Turkish Rivers," Journal of Hydrometeorology, Vol. 6, 2005, pp. 280-290. doi:10.1175/JHM412.1

[16] F. Topaloglu, "Trend Detection of Streamflow Variables in Turkey," Fresenius Enviromental Buletin, Vol. 15, No. 7, 2006, pp. 644-653.

[17] H. Aksoy, "Hydrological Variability of the European Part of Turkey," Iranian Journal of Science and Technology, Transaction B, Engineering, Vol. 31, No. B2, 2007, pp. 225-236.

[18] J. K. Searcy and C. H. Hardison, "Double Mass Curves. Manual of hydrology: Part 1. General Surface Water Techniques," US Geological Survey, Water-Supply Paper 1541-B., 1960.

[19] R. M. Hirsch, J. R. Slack and R. A. Smith, "Techniques of Trend Analysis for Monthly Water Quality Data," Water Resources Research, Vol. 18, No. 1, 1982, pp. 107- 121. doi:10.1029/WR018i001p00107

[20] R. M. Hirsch and J. R. Slack, "Non-Parametric Trend Test for Seasonal Data with Serial Dependence," Water Resources Research, Vol. 20, No.4, 1984, pp. 727-732. doi:10.1029/WR020i006p00727