

[Home](#) > [Journal](#) > [Earth & Environmental Sciences](#) > [JWARP](#)
[Indexing](#) | [View Papers](#) | [Aims & Scope](#) | [Editorial Board](#) | [Guideline](#) | [Article Processing Charges](#)
[JWARP](#) > Vol.2 No.8, August 2010



Comparison of Discharge Duration Curves from Two Adjacent Forested Catchments—Effect of Forest Age and Dominant Tree Species

PDF (Size:882KB) PP. 742-750 DOI : 10.4236/jwarp.2010.28086

Author(s)

Koji Tamai

ABSTRACT

The effects of forest age and dominant tree species on the water discharge volume have been analyzed by a paired-watershed experiment in two adjacent catchments in Tatsunokuchi-yama Experimental Forest, western Japan. The control period is 1937-1943. The treated periods are 1948-1953, 1968-1977, and 1996-2003. In these treated periods, the forest age or the dominant tree species were different between two adjacent periods. Differences in the discharge duration curves from the two catchments are compared for the control and the treated periods. A significant change in the discharge duration curves is seen in the third treated period (1996-2003) on days with low water, when the forest age difference between the adjacent catchments was 35 years. This is believed to be the result of differences in forest age and forest treatment just after the occurrence of pine wilt disease.

KEYWORDS

Paired-Watershed Experiment, Forest Age Difference

Cite this paper

K. Tamai, "Comparison of Discharge Duration Curves from Two Adjacent Forested Catchments—Effect of Forest Age and Dominant Tree Species," *Journal of Water Resource and Protection*, Vol. 2 No. 8, 2010, pp. 742-750. doi: 10.4236/jwarp.2010.28086.

References

- [1] J. M. Bosch and J. D. Hewlett, " A Review of Catchment Experiments to Determine the Effect of Vegetation Changes on Water Yield and Evapotranspiration," *Journal of Hydrology*, Vol. 55, No. 1, 1982, pp. 3-23.
- [2] T. Tanaka and K. Suzuki, " Reconsideration on the Historical Papers Reporting the Effect of Vegetation Changes on Water Yield," *Water Science*, Vol. 52, No. 300, 2008, pp. 46-68.
- [3] H. Komatsu, " Forest Categorization According to Dry- Canopy Evaporation Rates in the Growing Season: Comparison of the Priestley-Taylor Coefficient Values from Various Observation Sites," *Hydrological Processes*, Vol. 19, No. 19, 2005, pp. 3873-3896.
- [4] H. Komatsu, N. Tanaka and T. Kume, " Do Coniferous Forests Evaporate More Water than Broad-Leaved Forests in Japan?" *Journal of Hydrology*, Vol. 336, No. 3-4, 2007, pp. 361-375.
- [5] G. Kuczera, " Prediction of Water Yield Reductions Following a Bushfire in Ash-Mixed Species Eucalypt Forest," *Journal of Hydrology*, Vol. 94, No. 21, 1987, pp. 215-236.
- [6] Y. Kosugi and M. Katsuyama, " Evapotranspiration over a Japanese Cypress Forest. II. Comparison of the Eddy Covariance and Water Budget Methods," *Journal of Hydrology*, Vol. 334, No. 3-4, 2007, pp. 305-311.
- [7] M. Fujieda, T. Kishioka and T. Abe, " Effects of Forest Fire on Runoff from Minami-Tani, Tatsunokuchi-Yama," *Journal of Japanese Forest Society*, Vol. 61, No. 5, 1979, pp. 184-186.

- [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](#)

Downloads:	402,262
Visits:	1,011,071

[Sponsors, Associates, and Links >>](#)

- [8] T. Abe and M. Tani, " Streamflow Changes after Killing of Pine Trees by the Pine-Wood Nematode," Journal of Japanese Forestry Society, Vol. 67, No. 7, 1985, pp. 261-270.
- [9] K. Tamai, Y. Goto, T. Miyama and Y. Kominami, " Influence of Forest Decline by Forest Fire and Pine Wilt Disease on Discharge and Discharge Duration Curve: In the Case of Tatsunokuchi-Yama Experimental Forest," Journal of Japanese Forest Society, Vol. 86, No. 4, 2004, pp. 375-379.
- [10] K. Tamai, " A Paired-Catchment Experiment in the Tat-sunokuchi-Yama Experimental Forest, Japan: The Influence of Forest Disturbance on Water Discharge," WIT Transactions on Ecology and Environment, Vol. 83, 2005, pp. 173-181.
- [11] Forest Experiment Station Ministry of Agriculture and Forestry, " Statistical Report of Hydrological Observation at Experimental Watersheds (Daily Discharge Volume and Precipitation)," Forest Experiment Station in Ministry of Agriculture and Forestry, 1961, p. 255.
- [12] Forest Influences Unit and Okayama Experimental Site, " Statistical Report of Hydrological Observation at Tat-sunokuchiyama Experimental Watershed," Annual report of Kansai Branch Station, Forest Experiment Station, No. 22, 1981, pp. 56-62.
- [13] Forest Influences Unit and Okayama Experimental Site, " Statistical Report of Hydrological Observation at Tat-sunokuchiyama Experimental Watershed (January, 1959- December, 1977)," Bulletin of Forestry & Forest Products Research Institute, No. 308, 1979, pp. 133-195.
- [14] Y. Goto, K. Tamai, Y. Kominami and T. Miyama, " Hydrological Observation Reports in Tatsunokuchi-Yama Experimental Forest (January, 1981-December, 2000)," Bulletin of Forestry & Forest Products Research Institute, Vol. 4, No. 1, 2005, pp. 87-133.
- [15] K. Tamai, Y. Goto, Y. Kominami, T. Miyama and I. Ho-soda, " Hydrological Observation Reports in Tatsunokuchi-Yama Experimental Forest (January, 2001-December, 2005)," Bulletin of Forestry & Forest Products Research Institute, Vol. 7, No. 3, 2008, pp. 125-138.
- [16] N. Inaba, K. Kondo, S. Numamoto and S. Hayashi, " Influence of the Definition of Water-Year Period on Discharge Duration Analysis Focused on Low Flow: In the Case of the Tatsunokuchi-Yama