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Editorial

Chemical and Biochemical Processes of Watershed Ecosystems and Their Impacts on Water Quality

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This Special Issue of *Water* focuses on the natural and anthropogenic impacts on water quality in watershed ecosystems. Six papers have been published in this Special Issue, and papers describing the impact of natural–invasive plants, cultivated animals and anthropogenic activity on aquatic ecosystems are included.

Somlyai, I. et al. documented the anthropogenic effects on the water chemistry of small surface watercourses in agricultural lands in Hungary in their paper "Heterogeneity and Anthropogenic Impacts on a Small Lowland Stream" [1]. They clarified the great heterogeneity of physical and chemical variables of water flowing through small watercourses caused by different types and strengths of human impacts.

Huang, Y. et al. documented the direct effect of fish on nutrient levels in eutrophic shallow lakes in China in their paper "Effects of Crucian Carp (*Carassius auratus*) on Water Quality in Aquatic Ecosystems: An Experimental Mesocosm Study" [2]. They provided evidence that the crucian carp can increase TN and TP, enhance the phytoplankton biomass and increase water turbidity, thereby contributing significantly to the deterioration of the water quality.

Haraguchi, A. and Sakaki, M. documented the formation process of soil chemistry by foliage in a pine forest in Japan in their paper "Formation of Soil Chemical Environment in Coastal *Pinus thunbergii* Parlatore Forest in Southwestern Japan" [3]. Along the succession from a pine forest to an evergreen broadleaf stand, the higher nitrogen flux in the mixed stand and in the evergreen broadleaf stand, as well as the lower C/N ratio of the litter of broadleaf species, accelerated nitrogen accumulation in the soil in the stands, with high dominance of broadleaf species compared to the pine-dominated stand.

Moiseenko, T.I. et al. documented heavy metal and acid deposition in small lakes caused by airborne contamination of the Arctic in Russia in their paper "Water Chemistry of Arctic Lakes under Airborne Contamination of Watersheds" [4]. They proved that acidification and contamination by heavy metals of water are caused by sulfur dioxide and metal emissions from copper–nickel smelters in the catchments.

Mutshekwa, T. et al. documented leaf litter nutrient inputs and decomposition associated with native and invasive plant species using a mesocosm approach in their paper "Nutrient Release Dynamics Associated with Native and Invasive Leaf Litter Decomposition: A Mesocosm Experiment" [5]. They found a clear species difference in leaf litter decomposition rates and nutrient release functions of leaf litters, although the invasive–native species difference was smaller than the species-specific differences.

Haraguchi, A. and Sakaki, M. documented the spatial heterogeneity of sea salt deposition in a coastal pine forest in Japan in their paper "Spatial Distribution of Sea Salt Deposition in a Coastal *Pinus thunbergii* Forest" [6]. They found some hot spots of sea salt deposition on the soil surface at hollows of the ground surface, the slope-facing coastal line or sites with an abrupt increase in height where the canopy faces the coast.

The water quality was determined by various chemical and biological processes, as well as their complex interactions. There are various types of processes such as those determining the chemical environment of aquatic systems, and most of the driving forces

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of these processes are the function of various organisms, including aquatic macrophytes, algae, microorganisms and humans. Knowledge on chemical and biochemical processes impacting on water quality provides suggestions on how to remove the impacts on and rehabilitate contaminated aquatic systems. Hence, investigations of these processes are useful for considering procedures for the removal of contaminants, avoiding harmful impacts on organisms and the conservation of watershed ecosystems encompassing rivers, reservoirs, wetlands, aquifer, forests, grasslands and agroecosystems, and a whole range of other types of ecosystems related to water environments. Due to the high diversity of processes and functions, each paper included in the Special Issue is a case study focusing on a specific process and function in a specific watershed. The relationships between water quality and the growth of organisms are various; i.e., contaminated water is harmful to one species, whereas it is favorable to another species. Therefore, accumulated case studies will provide useful information for the various demands in the management of aquatic environments and ecosystems. We can extract generalized interactions from accumulated case studies and then contribute to the development of the environmental sciences in ecosystems in watersheds.

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