

Vladimir Aizen
University of Idaho

Collaborative Research: Diagnosis Of Changes In Alpine Water Storages And Land Surface Degradation In Pamir Mountains And Amu Dariya River Basin.

The proposed research relates to the Projection component, focused on modeling and predicting environmental, social, and economic consequences of snow/glacier/lake cover loss on land degradation and agricultural resources in Amu Dariya River basin (Tajikistan, Uzbekistan, Pamir mountains) by integrating NASA Remote Sensing products and in situ long-term terrestrial data. Problem statement: Amu Dariya River originates in the Pamir mountains (Tajikistan), providing 65% of inflow to the Aral Sea basin and supporting agriculture in dry land areas populated by over 60 million people. Amu Dariya R. Basin is characterized by complex social and economic problems ensuing from extensive resource consumption and natural responses to global climate change. Human activity contributes to land degradation via poorly constructed and maintained irrigation systems, salinisation of irrigated lands, and poor pasture management. The feedback effects of extended desertification are increased wind erosion, atmospheric contamination, and dust loading, which accelerate snow and glacier melt. The proposed project will simulate and predict the dynamics and feedbacks of a half-century of changes in seasonal snow/glaciers/lakes water resources and their effects on land degradation in the Amu Dariya River basin. The research will improve our understanding of global change consequences and their prediction, and will help to answer the questions: How well we can predict when and where the thresholds will be crossed? How well we can predict their ecological consequences? How will the local and regional changes in glacier/snow cover feed back to the land degradation? The project will develop simulations with evaluations and predictions of 1) Water resources changes and land degradation, 2) location and time of the thresholds; 3) hydro-ecological consequences; and 4) hazards protection plan including a prioritized recommendations. The proposed project continues the UI-led team, multi-year research in central Asia on glacio-hydrological, climatic, and environmental changes.