Glacier monitoring, capacity building and related cryospheric research in Central Asia

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Climate change is a major challenge for humanity and the related global implications will influence and threaten future economies and livelihood of coming generations, especially in developing countries. Central Asia is one of the regions mostly vulnerable to climate change considering its hydrological constraints. Tien Shan and Pamir, are among the largest mountain systems of the world, and play a significant role in serving water to the arid and continental region. Future water resources in Central Asia depend strongly on the cryosphere, particularly on snow, glaciers and permafrost. These cryospheric components store enormous amounts of fresh water and under the ongoing climate warming, expected changes will play an important role for future water availability in the region. Recent research clearly points out that a) for current climate conditions, water release by the cryosphere, particularly glaciers, is fundamental to keep runoff sufficient during the dry summer months and b) at the end of this century the water contribution of glaciers will be drastically reduced. Certain catchments are expected to completely dry-out. This setting creates a complex set of future challenges in the domains of water management, energy production, irrigation, agriculture, environment, disaster risk reduction, security and public health and potential political tension and conflicts between the countries cannot be excluded.

Notably, climate change also poses challenges in the field of climate services, as the lack of reliable data and commitment of the governments to fully integrate their observatory systems inhibits the sustainable adaptation and development of the region. At this point, the project CICADA (Cryospheric Climate Services for improved Adaptations) is currently contributing to the improvement of the Cryospheric Climate Services in the Central Asian countries by installing modern monitoring infrastructure, by training local students and researchers and by using the
collected in situ measurements in combination with remote sensing and modelling to provide climate scenarios and services for water runoff and natural hazards. This is a prerequisite to allow early planning and adaptation measures within the water resource management and disaster risk reduction sectors.