PhD Position: Designing Climate Change Adaptation Strategies in Alpine Headwaters with Process-Based Cryo-Hydrological Modelling

Mountains, often referred to as the "water towers" of the hydrological cycle, store water as snow, ice, and groundwater, gradually releasing it to streams. Recent observations have shown long-term changes in groundwater and stream dynamics in mountain regions, attributed to climate change-induced modifications of the cryosphere (snow drought, glacier melt, and permafrost thawing). Given the significant impact these changes can have on natural and socio-ecosystem services, it is crucial to provide Alpine stakeholders with predictions on future water availability to design sustainable adaptation strategies.

Project overview: The PhD project is part of the European Interreg Alpine Space project, WATERWISE, which aims to provide guidance for sustainable water management strategies in the Alps. This specific PhD project will focus on developing and deploying a socio-cryo-hydrological modeling framework to predict future water availability in headwaters and test water management strategies. Key responsibilities include:

1. **Model development and integration:** Evaluate and couple state-of-the-art cryosphere, hydrological, and socio-economic models. Integrate these developments into the HydroModPy modeling platform.
2. **Data compilation and model calibration:** Compile a comprehensive database of hydrological, climatic, and geomorphic data for the 7 pilot sites of the Waterwise project. Calibrate the models and assess the uncertainties using state-of-the-art data assimilation and geostatistical methods.
3. **Scenario testing:** Collaborate with the Waterwise consortium members and stakeholders to define and test climate change and socio-economic scenarios using the model. Evaluate the sustainability of land and water management practices.
4. **Web Interface Development:** Participate in the development of a web interface for stakeholders to visualize model results.

Location: The position is based at the Centre for Hydrogeology and Geothermics (CHYN) at the University of Neuchâtel. The CHYN offers a stimulating research environment with approximately 50 collaborators. The candidate will have access to a comprehensive pool of field and laboratory equipment, technical support staff, and a dynamic PhD school. She/He will integrate the dynamic teams of the Waterwise project and the developers of the HydroModPy platform. More information on ongoing projects can be found at CHYN and Dr. Clément Roques' website.

Required Qualifications:

- MSc in Hydrology, Earth Science, Environmental Engineering, or a related field
- Strong interest in research and science-policy applications
- Knowledge/experience in data analysis and numerical modeling
- Proficiency in Python programming
- Fluency and excellent writing skills in English, with a strong interest in scientific and public communication
- Experience in software development is an advantage

Duration: 3 years with the option to extend for 1 year

Start Date: Upon agreement, but no later than November 1st 2024.

Applications should include:

- A concise motivation statement (1 page) for the research project
- A CV
- Copies of academic qualifications
- Names and contact information of one referee

Submit your application as a single PDF file to application.chyn@unine.ch with the subject line **"[Application Waterwise PhD:] Your Name".** The application deadline is **September 15th**. For additional questions regarding the position, contact Dr. Clément Roques at clement.roques@unine.ch using the subject line "[Question Waterwise PhD:] Your Name".