

**Mölg, T., C. Georges, and G. Kaser** (2003): The contribution of increased incoming shortwave radiation to the retreat of the Rwenzori Glaciers, East Africa, during the 20th century. *International Journal of Climatology*, 23, 291-303, doi: 10.1002/joc.877.

### **Abstract**

Based on (i) the observation of spatially differential glacier retreats in the tropical Rwenzori Range (East Africa) during the 20th century, which are most striking on the mountains Baker and Speke, and (ii) the information on an abrupt climate change to drier conditions in East Africa at the end of the 19th century, the following hypothesis is derived: due to a drier atmosphere than in a previous period both accumulation, possibly supported by increasing air temperatures, and convective cloud activity have decreased. Consequently, increased incoming shortwave radiation, especially during the morning hours, induced a differentially increased ablation which could not be compensated by mass advection on the mountains Baker and Speke.

The results obtained from a combined radiation-terrain model, run for one more humid and one drier climatic scenario, confirm the hypothesis by quantifying the correlation between increased incoming shortwave radiation and glacier surface area loss. In the context of modern climate fluctuations, the results are a further indicator for a drastic climatic dislocation in East Africa at the end of the 19th century, leaving a humid regime behind and leading to a relatively dry regime, which is forcing the recession of glaciers not only by less accumulation but also by less protection against shortwave radiation through clouds.