



Probing the atmospheric boundary layer by remotely piloted vehicles

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A remotely piloted vehicle (RPV) has been designed and developed for the measurement of profiles of temperature and humidity in the atmospheric boundary layer. In its present version it carries a payload of 100 g up to altitudes over 2000 m above ground. The instrumentation covers sensors for pressure, temperature and humidity, and a data-logger that enables the storage of about half an hour of data with sampling rate of 3 Hz. This enables a high vertical resolution even at the maximum ascent rate of the RPV of 6 m/s.

The RPV KALI, named by the location of its first successful campaign in the Himalayan Kali Gandaki valley (Nepal), has been constructed in particular for operation in remote areas and under harsh environmental conditions. It has been operated successfully during various campaigns in Nepal, Bolivia and Germany. About 300 measurement flights have been performed since 2001. An average altitude of 1600 m above ground has been reached during these flights with a maximum of 3200 m. Due to an focus on mountain meteorology the start sites have been located at altitudes up to 4800 m a.s.l.

Besides a short technical description of the system, which provides a cost effective alternative to radio soundings, measured atmospheric profiles with respect to various boundary layer phenomena will be presented. In addition a short outlook on current development with respect to on-board wind measurement and operation in polar environment will be given.