How to improve weather and climate predictions for the tropics?

By the middle of this century half of the global population will live in the tropics. This area, which makes up 40% of the Earth's surface, is characterized by large interannual variability and high vulnerability of the local population against hazards such as droughts and floods. Weather and climate are determined by complex multi-scale meteorological processes and interactions with aerosols, the ocean and the land surface. Within the tropics, monsoon systems as those in West Africa, India and East Asia are of particular importance and interest, as they provide water to some of the most densely populated parts of the planet and at the same time show considerable sensitivity and non-linearity.
This talk will aim to summarize where we stand with respect to weather and climate predictions in the tropics, with a particular focus on West Africa. Building on this, promising avenues for future research and improvements for predictive capability will be discussed. This will draw largely on recent results from the EU-funded "Dynamics-aerosol-chemistry-cloud interactions in West Africa" (DACCIWA) project (2010–2015) and the ongoing Collaborative Research Center „Waves to Weather" (since 2015).