



## The field study

EUREC<sup>4</sup>A (Elucidating the role of clouds-circulation coupling in climate) is a European initiated field study of cloud effects on climate. It involves more than 30 national and international partner institutions. This field study is the capstone of the World Climate Research Programme's "Grand Science Challenges on Clouds, Circulation and Climate Sensitivity". It builds on a decade of measurements in the tropical Atlantic; measurements initiated with the establishment of the Barbados Cloud Observatory in 2010, and continued with two measurement campaigns with the research aircraft HALO in 2013 and 2016. The German-French led campaign EUREC<sup>4</sup>A is the most ambitious European field study in the field of atmospheric and ocean sciences. For the first time, small-scale and large-scale observations of atmospheric and oceanic processes will be combined in a measurement campaign, and the new generation of storm-resolving models will be used.

## Why

EUREC<sup>4</sup>A is the first field study to test hypothesized mechanisms whereby changes in cloudiness with global warming act to amplify this warming, a positive feedback which would increase Earth's climate sensitivity. These hypotheses have been distilled from several rounds of international climate model intercomparison studies (CMIP), over a period of decades. EUREC<sup>4</sup>A hopes to test whether models with a strong reduction in cloudiness, which then amplifies warming from CO<sub>2</sub>, are correct.

## When and where

The field study will take place between 20 January and 20 February 2020 with operations based out of Barbados. Operations will focus on an area east and south of Barbados in the northern Tropical Atlantic (57 W 13 N).



## How

The nucleus for the field study involves the deployment of four research aircrafts, four research vessels, advanced ground based remote sensing, a new generation autonomous measurement systems, sophisticated satellite remote sensing and state-of-the-art turbulence-resolving modelling (100 m, over thousands of km).

## Measuring instruments and platforms

- 1 cloud observatory on Barbados
- 4 aircrafts (ATR-42, HALO, Twin Otter, WP-3D)
- 4 research vessels (L'Atalante, Maria S Merian, Meteor, Ron Brown)
- 1 wave-propelled unmanned autonomous surface vessel "AutoNaut"
- 5 buoyancy-powered autonomous underwater vehicles
- 1 unmanned aerial vehicle "Boréal UAV"
- 2 balloon kites "Max Planck CloudKites"
- 1 weather radar „PoldiRad“ (Polarization Diversity Doppler Radar)
- Further remote sensing platforms and dropsondes