

# Contents

## **Preface** 4

## **Introduction** 5

## **Highlights**

- Sea ice extent from satellite microwave sensors 9
- Observing the surface energy budget at Cabauw: A status report 15
- Recent developments in KNMI's surface observing methods 21
- High resolution observations for climate change monitoring of extremes 28
- Regional differences in the extreme rainfall climatology in the Netherlands 34
- Linking changes in hourly precipitation extremes to the Clausius-Clapeyron relation 39
- Extreme rainfall climatology from weather radar 44
- Monitoring bird migration by weather radar 50
- Infrasound and seismology in the Low Frequency Array LOFAR 56
- TROPOMI: Sensing the Troposphere from Space 62
- The central role of the tropics in the methane life cycle 68
- The statistical mechanics of turbulent flows 73
- Technological developments in scientific data exchange:
  - recently developed portals, services and networks at KNMI 79
- A Monitoring and Forecasting System for Atmospheric Composition: The GEMS Project 85
- Air quality monitoring and forecasting in China 90
- The prediction and occurrence of aircraft lightning encounters at Amsterdam-Schiphol Airport 96
- Improved and tailored low visibility forecasts for Amsterdam Airport Schiphol 101
- EC-EARTH: goals, developments and scientific perspectives 106
- High-end climate change scenarios for flood protection of the Netherlands 112

## **Appendices**

- Organisation chart 119
- Publications per division 120
  - Weather Research and Development 120
  - Climate Observations 128
  - Global Climate 134
  - Regional Climate 139
  - Chemistry and Climate 145
  - Climate Services 149
  - Seismology 153
  - R&D Information and Observation Technology 155

## **Acronyms** 156