Koninklijk Nederlands
Meteorologisch Instituut
Ministerie van Infrastructuur en Milieu

Documentatie Archiefstukken

Cabauw en enkele andere meetfaciliteiten, 1959 - 2008
Meetcampagnes en veldexperimenten, 1981 - 2008

Wim Monna

KNMI Intern Rapport IR-2016-05

Documentatie Archiefstukken

Cabauw en enkele andere meetfaciliteiten, 1959 - 2008
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Vakgroep R&D Waarnemingen en Datatechnologie

Voormalige Afdelingen:
Klimaat en Seismologie – Regionaal Klimaat
Wetenschappelijk Onderzoek – Atmosfeer Onderzoek
Wetenschappelijk Onderzoek – Fysische Meteorologie
Wetenschappelijk Onderzoek – Meteorologisch Onderzoek-B
Wetenschappelijk Onderzoek – Speciale Projectgroep Grenslaagmeteorologie
Wetenschappelijk Onderzoek

KNMI Intern Rapport IR 2016-05

Wim Monna

Inleiding

Dit rapport bevat een inventarisatie en beschrijving van het archief van achtergrond-documenten van de 200 m mast te Cabauw en enkele andere meetfaciliteiten. Het beslaat de periode van 1959 tot 2008. De kern hiervan betreft de ontwikkeling en het gebruik van de Cabauw-mast vanaf rond 1970. Een deel van dit archief was al eerder genummerd. Dit deel is om praktische redenen opgeslagen ná de veldexperimenten (zie hierna), dus niet in chronologische volgorde. Het tweede deel van het rapport beschrijft het archief van een twintigtal internationale meetcampagnes en veldexperimenten van 1981 tot 2008. Het beheer van dit archief valt binnen de Vakgroep Waarnemingen Operationeel. Het is opgeslagen in de Compactus van het KNMI.

De ambtelijke correspondentie rond deze onderwerpen wordt ook binnen het KNMI bewaard. Per 1 juli 2016 heeft het KNMI haar documentaire dienstverlening ondergebracht bij de afdeling Documentaire Dienstverlening van IBI/DCI bij IenM. Deze dienstverlening bestaat bijvoorbeeld uit het digitaliseren, registreren en controleren van de poststromen. Ook kunnen hier belangrijke documenten worden opgeslagen, beheerd en met elkaar gedeeld. IenM heeft besloten een groot deel van de bedrijfsvoeringstaken van de bestuurskern, de directies en agentschappen te concentreren bij de Corporate Dienst en IBI. Ook de bedrijfsvoeringstaken van het KNMI vallen hieronder. Als gevolg van deze centralisatie zijn de drie KNMI-medewerkers die dit werk deden per 1 juli 2016 in dienst getreden bij IBI/IenM. Hun werkplek blijft wel op het KNMI. Inmiddels heeft Martin Lindenaar alle correspondentie over de Cabauw mast vanaf de voorbereidingen voor de bouw gedigitaliseerd.

Het belang van dit archief: Metadata

Metadata betreft achtergrondinformatie over o.a. meetinstrumenten, meetcampagnes en technische constructies. Voorbeelden zijn ijkingen van meetinstrumenten, logboeken over omstandigheden tijdens meetcampagnes, en ontwerpcriteria van constructies. Dergelijke metadata zijn essentieel voor de interpretatie van meetgegevens, analyses van significantie en foutenmarges van meetresultaten, en voor onderzoek naar de oorzaken van onverwachte afwijkingen in de meetgegevens. Omdat databases vaak ook lang na de metingen worden gebruikt voor (nieuw) onderzoek is langdurige opslag van deze metadata essentieel. Goede afspraken over beheer, opslag en toegang zijn daarbij van groot belang om borging op lange termijn te garanderen.

Toelichting

De hier nu gerubriceerde en beschreven documenten waren ongeordend opgeslagen in de Compactus. In de loop der jaren was het bestand steeds groter geworden. Het beslaat nu ruwweg de periode 1959 – 2008 en heeft een omvang van ca. 12 meter. Omdat er geen inventaris was kon niet op eenvoudige wijze in dit bestand worden gezocht. De viering van het veertigjarig jubileum van de Cabauw mast in 2012 was de aanleiding om een rapport over de geschiedenis van de 200 m. mast te schrijven (Monna and Bosveld, 2013). Daarbij werd uitgebreid in het bestand gezocht naar nuttige informatie, en werd al doende een overzicht verkregen van het opgeslagen materiaal. Besloten werd tenslotte dit archief te documenteren en systematisch op te slaan. Enkele mappen over andere onderwerpen die zich tussen de stukken bevonden, zoals oceanografie en verslagen van vergadering, zijn ook in dit archief opgenomen.

Bij de beschrijving van de mappen over meetcampagnes en veldexperimenten is een kort stukje tekst uit een publicatie over elk experiment geciteerd. Dat geeft een beeld van de doelstellingen van de verschillende meetcampagnes en veldexperimenten.

Toekomst

Tegenwoordig is het merendeel van de documentatie van technische ontwikkelingen en experimenten beschikbaar in digitale vorm. Diverse KNMI medewerkers beschikken echter nog over documentatie op papier van ná 2008. Het is aan te bevelen deze papieren documenten te zijner tijd te beschrijven en toe te voegen aan het huidige archief en dit document aan te passen.

Toegang tot dit archief

De Compactus is niet vrij toegankelijk. Het beheer wordt verzorgd door een medewerker van de Vakgroep Waarnemingen Operationeel. Inzage in het archief is uitsluitend mogelijk via deze medewerker. Contactpersoon is Fred Bosveld van de Vakgroep R&D Waarnemingen en Datatechnologie. De mappen staan niet allemaal in de volgorde van de beschrijving hieronder. Dat komt doordat de planken zo efficiënt mogelijk zijn gevuld met mappen van verschillende diktes. De medewerker van de Vakgroep Waarnemingen heeft een overzicht van de locaties van alle mappen. Tijdens het schrijven van dit rapport werd het archief geplaatst in stelling 35. Verplaatsing naar een andere stelling is in de toekomst niet uit te sluiten.

Samenvatting van het archief

Het archief bestaat uit de volgende deelbestanden:

Archief Wieringa *pagina's 7,8*
*D*it betreft het archief van voormalig KNMI-medewerker Jon Wieringa dat is overgedragen aan het KNMI. Het bevat besprekingen over en planningen voor de Cabauw mast en andere meetmasten, enkele studies over storingen op instrumenten door de mast, studies over meetreeksen en een aantal foto's, voornamelijk over de periode 1966 - 1978.

Archief Cabauw *pagina's 8-12*
Bevat o.a. informatie over instrumenten voor het meten van diverse parameters, over data-registratie en over databases. Bevat verder logboeken, bezoekrapporten, verslagen van vergaderingen, bouwtekeningen en foto's. Het bestrijkt de periode vanaf de bouw van de mast tot ca. 2000.

Archie Vlf aardingen 80 mam st *pagina 12*
Bevat documentatie over de data-registratie, en verder foto's, bouwtekeningen en nota's uit de zeventiger jaren.

Oceanografisch onderzoek *pagina 12*
Bevat documentatie over instrumentatie uit de jaren 1960 en 1970.

Verslagen van vergaderingen, niet compleet *pagina 12*
Bevat onder meer verslagen van de Werkgroepen Grenslaagmeteorologie en Wolken en Straling, en van het overleg tussen de Afdeling Fysische Meteorologie en de Instrumentele Afdeling. Periode 1973 – 2000.

Meetcampagnes en veldexperimenten, nationaal en internationaal *pagina's 12-24*
Bevat documentatie over internationale veldexperimenten in diverse landen waaraan het KNMI bijdroeg met een mobiel meetstation. Het bevat daarnaast documentatie over meet-campagnes met Cabauw als centrum, vaak als onderdeel van internationale meetcampag-nes, waaraan meestal diverse buitenlandse instituten deelnamen. Periode 1981 - 2008

Reeds eerder genummerd *pagina's 24,25*
Dit deel betreft diverse metingen in masten voorafgaand aan de Cabauw mast in de periode 1950 – 1972. Deze mappen zijn ouder dan het Archief Wieringa. Om praktische redenen zijn ze in de Compactus geplaatst ná de veldexperimenten.

Distributielijst *pagina 27*

Foto's

In sommige mappen zitten foto's. Meer foto's van sommige onderwerpen zijn te vinden in het archief van het informatiecentrum (v/h bibliotheek) van het KNMI. Daarin bevindt zich een behoorlijke collectie fotomateriaal (zowel op- en doorzicht) met betrekking tot de vakgebieden en bezigheden van het Instituut. Deze zijn (nog) niet gedigitaliseerd, maar kunnen in overleg met Wouter Jansen bekeken en eventueel ingescand worden.

Dankwoord

Jan Huizinga was mij zeer behulpzaam bij het wegwijs maken in de Compactus en het geordend opbergen van alle mappen. Hij is onlangs met pensioen gegaan. Zijn opvolger is Henk van Oel.

Referentie

Wim Monna and Fred Bosveld, 2013: In Higher Spheres; 40 years of observation at the Cabauw Site. KNMI-Publication 232, pp. 52.

Beschrijving van het archief

Nieuw beschreven

Archief Wieringa

W1. Wieringa
Besprekingen METOC 1966 – 1969.
METOC = Meteorologisch Onderzoek Cabauw.

W2. Wieringa
Besprekingen METOC 1970.

W3. Wieringa
Besprekingen METOC 1971.

W4. Wieringa
Besprekingen METOC 1972.

W5. Wieringa
Planning Cabauw 1973.

W6. Wieringa
Planning Cabauw 1974 – 1975.

W7. Wieringa
Instrumentatie Cabauw 1973 – 1975.

W8. Wieringa
Ontwikkelingen Cabauw. 1973 – 1979.
Mast info + bestands opbouw.

W9. Wieringa
Computerverwerking Cabauw. Rapporten 1977, 1978.

W10. Wieringa
Instrumentele Contactgroep INSA – MO (ICIM). Notulen 1975 – 1982.

W11. Wieringa
Bespreking meetmasten 1973 – 1974.

W12. Wieringa
Bespreking meetmasten 1975 – 1983.

W13. Wieringa
Ontwikkelingen en plannen Cabauw. 1977 – 1992.
Continu registratie en experimenten.

W14. Wieringa
Cabauw, kaartmateriaal en foto's, jaren '70.

W15. Wieringa
Maststoring Cabauw, Varia, diverse jaren.

W16. Wieringa
Ruwheid Cabauw.

W17. Wieringa
Cabauw profielen 1973, 74, 75 + ongepubliceerd intern KNMI report.

W18. Wieringa
Overzichtsstudie meetreeksen Cabauw. 1973, 74, 75, 77, 78.

W19. Wieringa
Concepten Cabauw artikel Wieringa en Van Ulden 1995.
Cabauw profielen 1973.
Magneetband beschrijving 1977,78 Nieuwendijk.

W20. Wieringa
Cabauw memo's, kleine rapportages.

W21. Wieringa
3 Technische Rapporten over Cabauw, w.o. Pim Bouwman, TUD, flux profiel relaties, 1990.

W22. Wieringa
Vlaardingen 80 m mast 1966 – 1070. Documentatie van de ontwikkelingen.
Wellicht gemaakt om Van Ulden te informeren bij zijn start op het KNMI.

W23. Wieringa
Projecten ca. 1967 – 1978. Uitgebreide documentatie en studies m.b.t. meetmasten.
Vlaardingen 80 m mast, NoRa mast (Noordwijk Radio), Cabauw, De Bilt, Schiphol, Flevo.
Maststoringen. Veel foto's.

W 24. Wieringa
Varia masten De Bilt, Noordwijk, Schiphol, Vlaardingen, Katwijk.

W 25. Wieringa
Oude foto's Cabauw, Vlaardingen?

W 26. Wieringa
Foto's NoRa mast (Noordwijk Radio).

Archief Cabauw

C1. Planning, voorstellen en discussies toekomst Cabauw.

C1.a. 1972 – 1978
C1.b. 1994 – 1998
C1.c. 1998 – 1999

C2. TNO rapport beweging masten, 1968.

C3. Nota's dataregistratie Cabauw, 1975 – 1983.

C4. Geschiedenis Cabauw per parameter; Van der Vliet.
Straling, wind, temperatuur, zicht, enz.

C4.a. 1972 – 1976
C4.b. 1977 – 1979
C4.c. 1981 – 1984
C4.d. 1986 – 1997

C5. Algemene informatie uit bezoekrapporten, 1986 – 1997.

C6. Windmetingen.

C6.a. Windsnelheid 213 m., 1970 – 1973.
C6.b. Uitrichting windrichtingspluggen, methodiek.
C6.c. Uitrichting windrichtingspluggen, 1976 – 1997.
C6.d. Uitrichting windrichtingspluggen, diversen.
C6.e. IJkingen anemometers diversen, documentatie propellervaan.
C6.f. IJkfactoren windrichtingspluggen, 1985 – 1997.
C6.g. Azimut potmeter ijkingen propellervanen, 1985 – 1997.
C6.h. IJkingen snelheid en richting propellervanen per instrument, 1980 – 1997.
C6.hh. Als C6.h, handgeschreven. Volledig identiek?
C6.i. Opstellingsgeschiedenis propellervanen, 1986 – 1997.
C6.ii. Opstellingsgeschiedenis en ijkingenpropellervanen, 1980 – 1985.
C6.iii. (Voorbereiding) inzet propellervanen, enkele nota's, 1979 – 1986.
C6.j.1. IJkcertificaten anemometers, 1972 – 1978.
C6.j.2. IJk certificaten, anemometers 1978 – 1981, propellervanen 1980 – 1983.
C6.j.3. IJkcertificaten propellervanen, 1984 – 1986.
C6.j.4. IJkcertificaten propellervanen, 1986 – 1993.
C6.j.5. IJkcertificaten propellervanen, 1993 – 1997.
C6.k. Opstellingsgeschiedenis propellervanen, 1980 – 1997.
C6.l. Sonische anemometer Kayo Denki DAT-300 en -600, fabrieksdocumentatie, beschrijving van de besturing + 2 tijdschrift-publicaties.
C6.m. Sonische anemometer, documentatie instrument en registratie, rond 1988.
C6.n. IJkingen diverse instrumenten periode, windrichting, neerslag temperatuur, zicht, 1976 – 1992.

C7. Temperatuur.
Droge- en nattebol temperatuur profiel Cabauw, historie 1986 – 1997.

C8. Zicht.

C8.a. Zichtmeting Cabauw, mistonderzoek, Wessels, 1975, 1979.
C8.b. Zichtprofiel Cabauw, historie, ijkfactoren, 1986 – 1997.
C8.c. Project 702 (Project "Stel").Metingen aan masten rond Schiphol i.v.m. korte termijn zichtverwachtingen. 1973.

C9. Straling, diversen, zeventiger jaren + 1992.

C10. Aerosol, waar onder SPUV, YESDAS.

C11. Handleiding Microbarograaf Cabauw, o.a. 1985.

C12. Energiebalans Cabauw.

C12.a. 1977 – 1982.
C12.b. 1981 – 1982.

C12-NH3 later tussengevoegd. Ammoniak metingen Cabauw 1987 – 1991.

C13. SODAR.

C13.a. Fabrieksdocumentatie Remtech Doppler Sodar, 1983, 1985, 2 delen.
C13.b. Gebruik Doppler Sodar, Anton Beljaars, jaren 1980.
C13.c. Logboek Doppler Sodar, 1981 – 1996.
C13.d. Registratie Sodar, jaren 1980.
C13.e. Voorstellen voor Sodar metingen, jaren 1980.
C13.f. Gebruik Sodar bij Clara-campagne, afvoeren Sodar, 1996, 1997.
C13.g. Sodar output, 8 ordners, 1990 – 1997.

C14. Windprofiler.

C14.a. Aanschaf en gebruik Windprofiler, 1992 – 1997.
C14.b. Fabrieks-documentatie Radian LAP-3000 windprofiler.

C15. Diversen Instrumentatie.

C15.a. Uitgebreide opstellingsgeschiedenis diverse instrumenten en randapparatuur, 1986 – 1997.
C15.b. Overzicht aansluitingen sensoren Cabauw, vanaf 1984 (?)
C15.c. Uitgebreide verzameling documenten diverse metingen; samenwerking met ECN.
C15.d. Besprekingsverslagen uitvoering Cabauw (1982 – 1997) en terreinen (1974 – 1998).

C16. Herinrichting Cabauw, diverse notities, 1996 – 2000.

C17. Registratie Cabauw.

C17.a. Digitale + analoge registratie, 1977.
C17.b. Meetprogramma grenslaagonderzoek, 1977 – 1979.
C17.c. Digitale + analoge registratie, ~ 1979.
C17.d. Diversen magneetband registratie, ~ 1972 – 1981.
C17.e. Registratie HP-21, beschrijving, diverse instructies, KNMI verslag V-303, 1978, 1980.
C17.f. Invoeren ijkfactoren m.b.v. ponskaarten, i.v.m. verwerking in De Bilt? ~ 1977, 1980.
C17.g. Logboek events Cabauw registratie, 1986 – 1997.
C17.h. IJking meetkanalen, 1985 – 1997.
C17.i. Aansluitingen registratie kanalen, “ blauwe gids “, geen jaartal.
C17.j. Registratie Cabauw, ongeordend, jaren ’70 en ’80.
C17.k. Kanaalindeling Cabauw registratie, 1980, 1983.
C17.l. Data inzameling, aanpassingen programmatuur, controle grenzen, TR-48.
C17.m. Data inzameling basisgegevens met PDP11, 1985 – 1996, 3 mappen.

C18. Diversen.

C18.a. Diverse nota’s, periode 1997 – 1987, verzamel map van Van Ulden.
C18.b. Diversen 1984 – 1987, waaronder nota verleden heden en toekomst Cabauw, TR-48 inzameling en opslag van Cabauw metingen, microbarograaf.
C18.c. Varia 1977 – 1989, waaronder dataregistratie, tuien, enz.

C19. Varia data-opslag en files.
5 mappen, nogal ongeordend, moeilijk in meer detail te beschrijven.

C20. Varia besprekingen, onderzoekjes, registratie.
7 mappen, nogal ongeordend, moeilijk in meer detail te beschrijven.

C21. Varia ijkingen en verslagen, o.a. Studiegroep meetmasten, METOC en Projectgroep Grenslaagmeteorologie, ~ 1967 – 1980.

C22. Resultaten.

C22.a. Vervanging data-opslag, wormschijfinhoud 1986, 1987, verstrekkingen, AWS Cabauw, einde Cabauw 1997.
C22.b. Documentatie programma's verzameltapes, ~ 1973 – 1984.
C22.c. Documentatie programma's verzameltapes, ~ 1982.
C22.d. Documentatie programma's verzameltapes, ~ 1982.
C22.e. Cabauw database archief, overzicht op hoofdlijnen, 1086 – 1992, nogal summier.
C22.ee. Cabauw database archief, overzicht op hoofdlijnen, 1086 – 2005, nogal summier.
C22.f. Overzicht inhoud floppy's en wormschijven, 1973 – 1997.
C22.g. Overzicht inhoud floppy's en wormschijven, 1994 – 1997, o.a. TEBEX, + logboek TEBEX.
C22.h. Overzicht inhoud floppy's en wormschijven, 1973 – 1996, jaargemiddelden tabellen.
C22.i. Ontbrekende 10-minuut blokken Cabauw 1984 – 1988.
C22.j. Ontbrekende 10-minuut blokken + logboekachtige aantekeningen, 1986 – 1994, handgeschreven.
C22.k. Tabellen maandgemiddelden Cabauw parameters, 1973 – 1995, 2 mappen.
C22.l. Plots maandgemiddelden Cabauw parameters, 1973 – 1995.
C22.m. Cabauw CABOPER plots, 2000, 2001, 4 mappen.
C22.n. Cabauw TEBEX plots, 1993 – 1997, 2 mappen.

C23. Cabauw correcties voor diverse kanalen. 1986 – 1997. 8 ordners.

C24. Logboek Cabauw gebeurtenissen en file beschrijving, 1986 – 1997.

C25. Bezoekrapporten Cabauw, 19 banden, 1972 – 1997.

C26. Waterpasmetingen trivaan.

C27. Varia meteorologische instrumenten.

C28. Mobibase data-opslag systeem.

C29. Diversen correspondentie
- Met gemeente Lopik
- Herinrichting meetterrein De Bilt
- Laboratoria De Bilt
- Organisatie INSA ondersteuning
- INSA ondersteuning 1994

C30. Foto overhead sheets Cabauw.

C31. Tekeningen Cabauw mast en instrumenten, Sylt.

C32. Foto's van diverse instrumenten te Cabauw, jaren 70 en 80.

C33. Stralingsbescherming. Enkele documenten over nationale regelgeving rond het gebruik van radioactieve bronnen van ioniserende straling.

C34. Bezoekrapporten Cabauw. 4 mappen van 29.3.2000 – 30.11.2009.

Archief Vlaardingen 80 m mast

C100. Documentatie Vlaardingen registratie periode 1971 – 1973.

C101. Vlaardingen, foto's, tekeningen, nota's.

Oceanografisch onderzoek

C200. Diversen instrumentatie, jaren 1960 en 1970
- Instructiemap oceanografische waarnemingen
- Manual Plessey Bathytermograaf
- Aanderaa stroommeter

Verslagen van vergaderingen, niet compleet

C300a. Verslagen vergaderingen Werkgroep Grenslaagmeteorologie + nota's okt 1979 – aug 1990.
C300b. Verslagen vergaderingen Werkgroep Grenslaagmeteorologie + nota's aug 1990 – dec 2000.
C301. Verslagen Werkgroep Wolken en Straling, april 1998 – april 2001 + enkele verslagen Stuurgroep Atmosferisch Onderzoek uit 1999.
C302. Verslagen overleg tussen de Afdeling Fysische Meteorologie en de Instrumentele Afdeling, jan 1973 – dec 1981 en sept 1987 – maart 1991.

Meetcampagnes en veldexperimenten, nationaal en internationaal

MV1, 3 mappen
PUKK81, 1981, Noord Duitse kust tussen Bremerhafen en Cuxhafen, KNMI, VU en 15 Duitse instituten. Hiervoor werd een mobiel meetstation gebouwd.
PUKK (Projekt zur Untersuchung des Küsten-Klimas) is a joint effort of 17 institutions of the FRG and the Netherlands. For the field phase (25th of September to the 9th of October, 1981) 140 scientists and coworkers joined in northwestern Germany in an area between Cuxhafen and Sprakensehl (northeast of Celle, close to the border to the German Democratic Republic). The experiments goal is to investigate atmospheric phenomena connected with a coastline.
Uit: Kraus, H., 1982: PUKK: A meso-scale experiment at the German North Sea coast. Beitr. Phys. Atmos., **4**, pp 370-382.

MV2, 5 mappen

COAST83, 1983, Nederlandse kust, KNMI meetwagen en 3 Franse instituten

A mesoscale shear convective cell was observed with a Doppler sodar and a minisodar on May 22, 1983 near the Netherlands Coast. Boundary-layer modifications associated with fair weather precipitating clouds were observed and a separation is undertaken between the different scales of the perturbations. There is difficulty in estimating the turbulent dissipation rate by the inertial method in the presence of mesoscale perturbations, which suggests the need for independent computation of spatial structure functions of velocity fluctuations and spectral density of velocity fluctuations as functions of frequency to observe the relationship between wave lengths and frequencies.

Uit: Weill, A., C. Mazaudier, G. Desbraux, C. Klapisz, A.G.M. Driedonks, J.P. Goutorbe, A. Druilhet and P. Durand, 1988: A mesoscale shear convective cell observed during the C.O.A.S.T experiment: acoustic sounder measurements. Bound.,-Layer Meteorol., **44**, pp 359-371. C.O.A.S.T = Cooperative Experiment with Acoustic Sounding Techniques

MV3, 5 mappen

MESOGERS84, 1984, Zuid west Frankrijk, Dept. Gers, KNMI meetwagen, 5 Franse en 1 Amerikaans instituut

During the MESOGERS 84 experiment in SW France from September 10 to October 5, 1984, different aspects of the Atmospheric Boundary Layer over complex terrain were investigated using a regional meteorological network, two instrumented aircraft and a Doppler Sodar network. The main objective has been to understand:
flow properties over inhomogeneous terrain;
fluxes and inversion height behaviour from a regional point of view.

Uit: Weill**,** A., C. Mazaudier, F. Baudin, C. Klapisz, F. Leca, M. Masmoudi, D. Vidal Madjar, R. Bernard, O. Taconet, B.S. Gera, A. Sauvaget, A. Druilhet, P. Durand, J.Y. Caneil, P. Mery, G. Dubosclard, A.C.M. Beljaars, W.A.A. Monna, J.G. van der Vliet, M. Crochet, D. Thomson and T. Carlson, 1988: The 'Mesogers 84' experiment : a report. In: Bound.-Layer Meteorol, **42**, no. 3, pp 251-264.

MV4, 2 mappen

Stormonderzoek Cabauw, 1985-1986, Cabauw, MT-TNO, KNMI, ECN

At MT-TNO a gust model has been developed in which wind data and wind statistics are translated into discrete gusts in order to calculate wind loads on wind turbines. The properties describing these discrete gusts concern amplitude, gradient, duration and shape of the gust. In this model assumptions have been made which are specifically applicable to small wind turbines. A brief description of this gust model is given in the next chapter. In order to develop a similar method for medium size and large wind turbines an extended research program has been set op, in which several Dutch research institutes and engineering agencies are involved. The aim is to derive a gust model describing the atmospheric turbulence at high levels. At two locations viz. the 25 m HAWT location at Petten and the 213 m meteo tower at Cabauw wind speed and wind direction at several heights have been measured during 100 and 700 hours respectively.

Uit: Verheij, F.J., 1988: Development of a gust model for the design of large wind turbines. J. Wind Eng. Ind. Aerodyn., **27**, pp 89-102.

MV5, 1 map

Flevo-86, 1986, Plevopolder, KNMI meetwagen, WUR?

Alleen logboek. Waarschijnlijk eerste experimenten met scintillometrie om gebiedsgemiddelde fluxen te meten. Geen publicatie gevonden; is er waarschijnlijk ook niet. Bevat ook een paar notities over CRAU-87.

MV6, 1 map

KNMI Garderen Speulderbos Experiment, 1987-1997, Speulderbos, KNMI, WUR, UvA, ECN, MT-TNO, KEMA

Dit experiment is ook onderdeel geweest van TEBEX (1995-1996)

In 1985 a start was made with ACIFORN (Acidification of Forests in the Netherlands), a sub-project of the Dutch Additional Programme on Acidification (Schneider and Bresser, 1986). The aim of ACIFORN was to assess the impact of air-pollution on tree vitality and tree growth (Vermetten et al., 1986). Two Douglas fir stands were selected, one near Kootwijk and one near Garderen (Speulderbos). The two locations have a different vitality, Speulderbos being the most vital one. These two eco-systems were monitored during the period 1986-1990.

A number of Dutch institutes were involved in the monitoring programme. The department of Air Pollution of the Agricultural University of Wageningen (AUW) performed profile measurements of air pollution concentration and micro-meteorological quantities. "De Dorschkamp", Research Institute for Forestry and Urban Ecology took care of the tree physiological and tree growth measurements. The department of Forestry of the AUW performed tree root measurements. Chemical composition of soil, rain and throughfall were measured by the department of Soil Science and Geology of the AUW. The Laboratory of Physical Geography and Soil Science of the University of Amsterdam took care of the soil physics and hydrology. This group of institutes formed the basis of ACIFORN. In 1988 KNMI started with detailed micro-meteorological measurements involving eddy-correlation measurements of momentum, heat and water vapour. At the same time ECN and TNO-MT became involved with more detailed air-pollution measurements. In 1989 KEMA performed xylem sapflow measurements and the University of Amsterdam performed micro-wave canopy water storage measurements.

The main objective of the KNMI contribution to ACIFORN was to determine flux-profile relations for heat and momentum and to develop an algorithm for the derivation of air-pollution deposition fluxes from concentration gradient observations. This also involved an assessment of the influence of limited fetch on the derived surface fluxes. More generally KNMI is interested in the behaviour of the components of the surface energy balance over various kinds of vegetation.

In January 1988 a 36 m tall mast was erected at the Speulderbos site. Instrumentation and testing took the next three month. The first measuring campaign was held during the month of May. In the summer we had great problems with a mice plague which had invaded vital amplifiers of the measuring system. During the month of September the next campaign was held. The winter period 1988-1989 was used for evaluation of the data. During the period March 30st 1989 till January 10th 1990 the measuring system was operated almost continuously.

During the growing season of 1989 a number of auxiliary measurements were performed by various groups. From the collaboration during this period a new project group emerged, CORRELACI (CORRELation of ACiforn results), in which KNMI participated. This group has tried to integrate the data-sets of the different disciplines around the central question of the influence of natural and artificial stress factors on the cycles of carbon, nutrients and water (Evers et. al, 1991).

This report documents the KNMI field experiment at the Speulderbos location during 1988 and 1989. It describes the forest, the measuring tower, the data acquisition

system and the database. It gives detailed information on instruments and their calibration. Corrections are described if they can be applied from the literature, or if they can be straight forwardly derived from the measurements and calibration results. Corrections which involve a more detailed analysis will be described elsewhere.

Uit: Bosveld, F.C., J.G. van der Vliet and W.A.A. Monna, 1998: The KNMI Garderen Experiment, Micro-meteorological Observations 1988-1989. KNMI Technical Report TR-208, pp 60.

MV7, 1 map

CRAU87, 1987, Zuid Frankrijk, KNMI meetwagen, WUR, Engelse , Duitse en Italiaanse instituten.

In the period from June 1 to June 25 1987, the so called “Crau” experiment took place in the South of France. The purpose of this experiment was (1) to study the exchange of heat and moisture between the earth’s surface and the atmosphere over homogeneous and non-homogeneous terrain in relation to satellite observations of surface temperature, and (2) to investigate the behavior of the atmospheric surface layer if dry, warm air is advected over a wet, cool surface. To that end several measuring stations were installed in the region of Crau. Crau is an extremely dry, flat area with penetrations of irrigated parcels along its border. It is situated east of the river Rhône, and approximately south of the line Arles – Salon-de-Provence.

Uit: Kohsiek, W., J.G. van der Vliet and W.A.A Monna, 1987: Crau 1988: the KNMI contribution. KNMI Technical Report TR-110, pp 41.

MV8, 1 map

EFEDA, 1991, Castilla la Mancha, Spanje, KNMI meetwagen, WUR, UvA, VU, Winand Staring Centre, totaal ruim 30 onderzoeksgroepen uit 8 landen

During June 1991 more than 30 scientific teams worked in Castilla-La Mancha, Spain, studying the energy and water transfer processes between soil, vegetation, and the atmosphere in semiarid conditions within the coordinated European research project EFEDA (European Field Experiment in Desertification-threatened Areas). Measurements were made from the microscale (e.g., measurements on single plants) up to a scale compatible with the grid size of global models. For this purpose three sites were selected 70 km apart and heavily instrumented at a scale in the order of 30 sq km. Aircraft missions, satellite data, and movable equipment were deployed to provide a bridge to the larger scale. This paper gives a description of the experimental design along with some of the preliminary results of this successful experiment.

Uit: Bolle, H.-J. et al., 1993: EFEDA - European field experiment in a desertification-threatened area. Ann. Geophys., **11**, pp 173-189.

Zie voor het veldwerk ook: Van den Hurk, B.J.J.M, 1996: Sparse canopy parameterizations for meteorological models, hoofdstuk 2. PhD Thesis, Department of Meteorology, WAU, Wageningen, the Netherlands, pp 46.

MV9, 1 map

DARR-94, 1994, Delft, KNMI meetwagen en TU Delft

DAR-94, genoemd naar Delft Atmospheric Research Radar, is een experiment van de TU Delft in samenwerking met het KNMI. Dit experiment is van belang voor het onderzoek bij zowel de TUD (elektromagnetische verstrooiing door en in stochastische media, remote sensing, radio-propagatie) als bij het KNMI (klimaatonderzoek). ……
De doelstellingen zijn: (1) Ontwikkeling van bewolkingsdetectie-methoden, (2) Verificatie van wolkenparameterisaties in klimaatmodellen, (3) Verificatie van een Large-Eddy Simulatie model, (4) Validatie van waterinhoud-bepaling uit satellietmetingen, (5) Onderzoek naar verstrooiingsmechanismen van elektromagnetische straling in de atmosfeer, (6) Propagatie-onderzoek, (7) Ontwikkeling van een experimentele methode om de druppelgrootteverdeling van bewolking te bepalen. ……
Dit rapport is bedoeld als een inleiding op het DARR-94 experiment.
Uit: Lomme, C.P.G., 1994: DAR-94. KNMI Technisch Rapport TR-170, pp 46.
Opmerking: Deze opstelling is ook nog gebruikt bij het CLARA campagne in 1996.

MV10, 1 map

BLEW-max (Tsinober) experiment, 5.9 – 24.9 1994, Cabauw, TUD, Uni. Tel-Aviv, ETH-Z.

Multi-hotwire metingen van de smallscale structuur van turbulentie in de 200 m. mast. Chaotisch verlopen experiment dat geen data heeft opgeleverd. Map met projectplan en overzicht van de gebeurtenissen. Heeft niet tot een publicatie geleid.

MV11, 1 map

K-vanen project, 1994-1996, Cabauw, WUR en KNMI

Dynamical properties of the K-Gill Propeller Vane (k-vane) are assessed from perturbation theory, wind tunnel and field comparison experiments. Measurement errors for average wind speed are negligible. The dynamic response of the k-vane can be described with a single response length which is the propeller's distance constant at 45^0 angle of attack. ……
The k-vanes discussed in this paper are used in a research project concerning turbulent fluxes of momentum and sensible heat in the atmospheric boundary layer over heterogeneous terrain. Six k-vanes have been installed at three levels (20, 100 and 180 m) at the 213 m meteorological mast of the Royal Netherlands Meteorological Institute (KNMI) at Cabauw.
Uit: Verkaik, J.W., 1998: Evaluation of the K-Gill propeller vane. J. Atm. Oceanic Technol., **3**, 15, pp 901-915.

MV12, 3 mappen

TEBEX, 1989 – 1997, gebied rond Cabauw, KNMI
Zie ook KNMI Garderen Speulderbos Experiment (1987-1997)

Clouds and radiation are two climatologically important elements of the energy and water budget of the Earth's atmosphere. These and other elements will be observed and modelled in the Tropospheric Energy and Water Budget Experiment, abbreviated as TEBEX, carried out by the Atmospheric Research Section of KNMI. The aims of TEBEX are: (a) to observe energetically relevant physical processes in the atmosphere on a subgrid-scale (i.e., in an area of the order of 100x100 km^2), and (b) to parameterise these processes in terms of grid variables of a regional or global circulation model. The aims of TEBEX are to a large extent similar to those of the GEWEX project, which is a part of WCRP.
Uit: Stammes, P., A.J. Feijt, A.C.A.P van Lammeren and G.J. Prangsma, 1994: TEBEX observations of clouds and radiation - potential and limitations. KNMI Technical Report TR-162, pp 52.

MV13, 8 mappen

CLARA, 1996, West Nederland, KNMI, ECN en TU Delft

In 1996, intensive measurements campaigns were organized in The Netherlands with a multitude of instruments, aimed at a qualitative and quantitative description of clouds and their impact on atmospheric radiation. The campaigns were part of the Clouds and Radiation (CLARA) project: an intensive experimental study of clouds and radiation in The Netherlands. Originally, three specific objectives were defined:

· The creation of a data set on clouds and cloud-radiation interaction.

· Validation and calibration of the retrieval algorithms of ground-based and satellite remote sensing instruments.

· Validation of cloud and radiative transfer models and parameterizations thereof.

During the project, a new objective was added:

· Sensor synergy: how to combine different instruments to optimize the retrieval of cloud parameters.

The campaigns were organized in the coastal area of the Netherlands. Most of the ground-based instruments were installed on the campus of Delft University of Technology. Additional measurements were done with the KNMI cloud detection system, which is a network of ceilometers and infrared radiometers over the central part of The Netherlands. Additional studies were done in the ECN cloud chamber, some 70 km to the north of Delft. During selected days, an instrumented aircraft was flown through the clouds.

Uit: Russchenberg, H.W.J., A.C.A.P. van Lammeren, A.J. Feijt, A. Khlyztov, A. Apituley and M.H.A.J. Herben, 1999: Ninth ARM Science Team Meeting Proc., San Antonio, Texas, March 22-26, 1999, pp 6.

MV14, 1 map

CLARE98, 1998, Chilbolton, Rutherford Appleton Laboratory (UK) en 2 andere Engelse instituten, KNMI, TU Delft, 3 Franse instituten en 3 Duitse instituten

The Cloud Lidar And Radar Experiment CLARE'98 campaign is part of the ESA 's Earth Observation Preparatory Programme (EOPP). The objectives of the CLARE'98 campaign are to collect and analyse radar and lidar as well as in-situ data to support the development of retrieval algorithms and to consolidate the scientific requirements of the future Earth Radiation Mission. The campaign took place during the period 5-23 October 1998 at the Observatory of Chilbolton, Hampshire, UK, to take advantage of a number of supporting ground-based observations. The largest instrument located at Chilbolton (is) the 3 GHz radar CAMRa with its 25 metres antenna. A considerable number of instruments were available for the campaign, on ground and airborne.

Uit: Wursteisen, P. and A. Illingworth, 1999: CLARE'98 Campaign Summary. ESA Intern. Workshop Proc., CLARE '98 Cloud Lidar and Radar Experiment, ESTEC, Noordwijk, the Netherlands, 13 – 14 September 1999, WPP-170, ISSN 1022-6656, pp 9-13.

MV15, 1 map

LITFASS, 1998, Lindenberg (D), KNMI meetwagen, WUR en 15 Duitse instituten

The LITFASS project ('Lindenberg Inhomogeneous Terrain – Fluxes between Atmosphere and Surface: a Long-term Study') of the Deutscher Wetterdienst (DWD, German Meteorological Service) aims to develop and to test a strategy for the determination and parameterization of the area averaged turbulent fluxes of heat, momentum, and water vapour over a heterogeneous land surface. These fluxes will be representative for an area of about 10 x 10 km^2 (while the typical patch size is between 10^{-1} to 10^0 km^2) corresponding to the size of a grid cell in the present operational numerical weather prediction model of the DWD. LITFASS consists of three components:

– the development of a non-hydrostatic micro-alpha-scale model (the LITFASS local model – LLM) with a grid size of about 100 x 100 m^2,

– experimental investigations of land surface – atmosphere exchange processes and boundary layer structure within a 20 x 20 km^2 area around the Meteorological Observatory Lindenberg,

– the assimilation of a data base as an interface between measurements and modelling activities.
Uit: Beyrich, F., H.-J. Herzog, and J. Neisser, 2002: The LITFASS project of DWD and the LITFASS-98 experiment: The project strategy and the experimental setup. Theor. Appl. Climatol., **73**, pp 3-18.

MV16, 1 map
CARL99, 1999, Palaiseau (F), diverse Franse, Duitse en Griekse instituten, KNMI.
During CARL project (Investigation of Cloud by Ground-based and Airborne Radar and Lidar) an experimental campaign was set up for the time period 26 April to 14 May 1999. The experiment was performed at the IPSL (Institut Pierre Simon Laplace) experimental site in Palaiseau, France, involving ground-based lidar-radar systems , as well as in situ validation measurements with the aid of the research aircraft ‘‘Merlin’’ from Meteo-France. The aircraft was carrying the GKSS cloud particle measuring system with three sizing probes for in situ microphysical measurements.
Uit: Mavromatidis, E and G. Kallos, 2003: An investigation of cold cloud formation with a three dimensional model with explicit microphysics. J. Geophys. Res., **108** (D14), pp 4420-4450.

Zie ook:
Pelon J, J. Testud, V. Noel, C. Tinel, A. Guyot, K. Caillaud, A. Protat, H. Chepfer, V. Trouillet, F. Baudin, H. Flamant, M. Quante, D. Nagel, H. Lemke, O. Danne, F. Albers, E. Raschke, G. Kallos and E. Mavromatidis, 2001: Investigation of cloud by ground-based and airborne radar and lidar (CARL). Final Report for the European Commission, DGXII, Contract PL-970567.

MV17, 1 map
CARL2000, 2000, Brest (F), diverse Franse, Duitse en Griekse instituten, KNMI, ESTEC.
The second experimental campaign of the CARL project was set up for the time period between 6 and 24 November 2000 aiming to investigate mixed phase clouds alone and in multi-layered cloud systems. The experiment was performed at Brest airport, France, involving ground-based radar system, as well as in situ validation measurements collected by the Meteo-France ‘Merlin IV’ research aircraft. The aircraft was carrying the GKSS cloud particle measuring system. The data collected during the campaign was a joint effort of the other partners involved in this project (IPSL, GKSS, KNMI).
Uit: Mavromatidis, E., T.I. Lekas and G. Kallos, 2007: Analysis of a two-layer cloud system with RAMS model and comparison to airborne observations. Environ. Fluid Mech., **7**, pp 537-568.

MV18, 1 map
EBEX2000, 2000, California (USA), 14 instituten, waaronder KNMI en WUR met enkele instrumenten. Bevat alleen een lijst met ingebrachte instrumenten.
An overview of the Energy Balance Experiment (EBEX-2000) is given. This experiment studied the ability of state-of-the-art measurements to close the surface energy balance over a surface (a vegetative canopy with large evapotranspiration) where closure has been difficult to obtain. A flood-irrigated cotton field over uniform terrain was used, though aerial imagery and direct flux measurements showed that the surface still was inhomogeneous. All major terms of the surface energy balance were measured at nine sites to characterize the spatial variability across the field. Included in these observations was an estimate of heat storage in the plant canopy. The resultant imbalance still was 10%, which exceeds the estimated measurement error. We speculate that horizontal advection in the layer between the canopy top and our flux measurement height may cause this imbalance, though our estimates of this term using our measurements resulted in values less than what would be required to balance the budget.
Uit: Oncley, Steven P, Thomas Foken, Roland Vogt, Wim Kohsiek, H. A. R. De Bruin, Christian Bernhofer, Andreas Christen, Eva van Gorsel, David Grantz, Christian

Feigenwinter, Irene Lehner, Claudia Liebethal, Heping Liu, Matthias Mauder, Andrea Pitacco, Luis Ribeiro, Tamas Weidinger, 2007: The Energy Balance Experiment EBEX-2000. Part I: overview and energy balance. Bound.-Layer Meteorol., **123**, pp 1-28.

MV19, 8 mappen
BALTEX en daarmee samenhangende experimenten
BALTEX, the Baltic Sea Experiment, internationaal experiment in het kader van GEWEX
Onderzoek naar de budgetten van energie en water van de Oostzee en omringende landen, en de interactie met verder weg gelegen regio's. 1993 tot heden.
BALTEX BRIDGE
Kernexperiment van BALTEX, april 1999 – maart 2001.
BALTEX BRIDGE Campaigns, BBC1 en BBC2
Twee experimenten rond Cabauw als bijdrage aan BALTEX BRIDGE. Experimenteel wolken onderzoek t.b.v. verbetering van bewolkingsmodellen. September 2001 en maart 2003.
CLIWA-NET, Cloud Liquid Water Network, Project binnen het 5^{e} kaderprogramma van de Europese Commissie
Verbetering van wolken waarnemingen in een Europees netwerk geleid door het KNMI met Cabauw als centrum. Gecoördineerd met BALTEX. Maart 2000 – februari 2003.
CNN I en CNN I (CLIWA-NET Network)
Netwerk voor wolken waarnemingen van 12 stations, waaronder Cabauw. Operationeel van 1 augustus 1 tot 29 september 2000 (CNN I) en van 2 april 2 tot 31 mei 2001 (CNN II). Onderdeel van CLIWA-NET.

BALTEX / Baltic Earth in het Baltic Sea basin
Achtergrond van dit grootschalige en langlopende experiment.
Het KNMI was bij een aantal deelexperimenten betrokken.

Uit de BALTEX website:

BALTEX Phase I (1993 – 2002) Objectives, formulated in 1995:
To explore and model the various mechanisms determining the space and time variability of energy and water budgets of the BALTEX region and this region's interactions with surrounding regions.
To relate these mechanisms to the large-scale circulation systems in the atmosphere and oceans over the globe.
To develop transportable methodologies in order to contribute to basic needs of climate, climate impact, and environmental research.

BALTEX Phase II (2003 - 2012) - Revised Objectives:
To evaluate in increasing detail regional models used for climate and environmental studies, and to develop strategies for climate and environmental impact assessments.
To obtain better and more comprehensive observations from the entire Baltic Sea basin, including new satellite data, in particular to cope with regional resolution requirements.
To further develop the numerical regional models for the atmosphere, the land surface including rivers and lakes, and the Baltic Sea including sea ice.
To lower the uncertainty when closing the energy and water budgets from measurements.

Baltic Earth
The goal of Baltic Earth is to achieve an improved Earth system understanding of the Baltic Sea region. Baltic Earth is the successor to BALTEX that was terminated in June 2013 after 20 years and two successful phases. The research components of BALTEX continue to be relevant, but now have a more holistic focus encompassing processes in the atmosphere, on land and in the sea, as well as processes and impacts related to the anthroposphere.

De verschillende deelprojecten hangen nauw samen en meetcampagnes gingen soms in elkaar over. Als gevolg daarvan bevatten de verschillende mappen vaak documenten van meer dan één deelproject. Gescheiden nummeren van alle deelprojecten is daardoor slecht mogelijk. Daarom is er voor gekozen alle mappen één en hetzelfde nummer te geven: MV19. Wel zijn de deelprojecten hieronder zo goed mogelijk beschreven.

BBC (Baltex Bridge Campaign), 2001, Regionaal netwerk rond Cabauw, met inbreng van KNMI, TU Delft, RIVM, IMAU, Defensie en van Instituten uit Duitsland, Engeland, Frankrijk, Rusland, Zweden en Zwitserland.
Clouds cause uncertainties in the determination of climate sensitivity to either natural or anthropogenic changes. Furthermore, clouds dominate our perception of the weather, and the relatively poor forecast of cloud and precipitation parameters in numerical weather prediction (NWP) models is striking. In order to improve modeling and forecasting of clouds in climate and NWP models the BALTEX BRIDGE Campaign (BBC) was conducted in the Netherlands in August/September 2001 as a contribution to the main field experiment of the Baltic Sea Experiment (BALTEX) from April 1999 to March 2001 (BRIDGE). The complex cloud processes, which involve spatial scales from less than 1 *m*m (condensation nuclei) to 1000 km (frontal systems) require an integrated measurement approach. Advanced remote sensing instruments were operated at the central facility in Cabauw, Netherlands, to derive the vertical cloud structure. A regional network of stations was operated within a 100 km × 100 km domain to observe solar radiation, cloud liquid water path, cloud-base temperature, and height. Aircraft and tethered balloon measurements were used to measure cloud microphysical parameters and solar radiation below, in, and above the cloud. Satellite measurements complemented the cloud observations by providing the spatial structure from above. In order to better understand the effect of cloud inhomogeneities on the radiation field, three-dimensional radiative transfer modeling was closely linked to the measurement activities. To evaluate the performance of dynamic atmospheric models for the cloudy atmosphere four operational climate and NWP models were compared to the observations.
Uit: Crewell,S., H. Bloemink, A. Feijt, S. G. García, D. Jolivet, O. A. Krasnov, A. Van Lammeren, U. Löhnert, E. Van Meijgaard, J. Meywerk, M. Quante, K. Pfeilsticker, S. Schmidt, T. Scholl, C. Simmer, M. Schröder, T. Trautmann, V. Venema, M. Wendisch and U. Willén, 2004: The Baltex Bridge Campaign: An integrated approach for a better understanding of clouds. Bull. Amer. Meteor. Soc., **85**, pp 1565-1584.

BBC I en II, 2001 en 2003, Regionaal netwerk rond Cabauw, met inbreng van KNMI, TU Delft, Defensie en van Instituten uit Duitsland, Frankrijk, Polen, Zweden en Zwitserland.
In 2001 und 2003 two large field experiments were conducted around the central meteorological measurement facility of the Dutch Meteorological Service (KNMI) at Cabauw, the Netherlands. BBC1 (First BALTEX BRIDGE Campaign) ran for two months covering August and September 2001, while BBC2 (Second BALTEX Bridge Campaign) lasted for roughly one month, May 2003. Both campaigns were devoted to continental clouds with a focus on boundary layer clouds, their spatial variability, vertical structure, and diurnal cycle. Especially in BBC2 precipitation and its small scale variability influencing weather radar returns, has been an additional focus. Both field experiments have been conducted in the framework of BALTEX (Baltic Sea Experiment), the European continental-scale experiment within GEWEX (Global Energy and Water Cycle Experiment) as a sub-programme of the World Climate Research Programme (WCRP). BRIDGE was the central field campaign within the first phase of BALTEX, which included several field experiments within a Central European modeling region with the Baltic Sea catchment area within its centre. The BBCs were funded from many national and international projects and organisations – the pillars being KNMI, which contributed with large internal funds and personnel, the Fifth Framework European Commission (EC) project CLIWA-Net (Cloud Liquid Water Network, (www.knmi.nl/samenw/cliwa-net) and the

4DClouds project (www.meteo.uni-bonn.de/projects/4d-clouds/) in the AFO2000 (Atmosphärenforschungsprogramm 2000) research programme of the German Ministry of Research and Education (BMBF). Important contributions came also from the CAARTER-programme of the EC, MeteoFrance, the MetOffice and the military of the Netherlands and many university groups from the Netherlands, France, Poland and Germany. All in all about 25 research groups were involved with roughly 100 scientists.
…….
The focus of both BBCs was experimental research on the cloudy continental troposphere. Spurred by the large deficiencies in climate and weather forecast models related to clouds and precipitation (IPCC 2001) and the many boundary layer cloud experiments conducted already over ocean regions, the coordinators of the BBCs selected a continental site to deliver data for research on the following goals:
Assessment of the quality of modeling the vertically integrated cloud liquid water in weather and climate models, which is the link between dynamic cloud processes and cloud radiation effects;
Assessment of the spatial variability of clouds in three dimensions and time to allow for the analysis of three-dimensional effects in cloud radiative transfer and to aid in the development of cloud parameterizations in weather and climate models; Assessment of the spatial and temporal variability in number and size of precipitating particles below clouds to allow for the analysis of non-linear effects on the relation between radar reflectivity and precipitation intensity.
Uit: Simmer, C, V. Venema, M. Diederich, S. Crewell, A. Feijt and Jean-Louis Brenguier, 2004: The Baltex Bridge Campaigns – A quest for continental cloud structures.
Proc. of the 14th Intern. Conf. on Clouds and Precipitation, Bologna, Italy, 18-23 July 2004, pp 1742-1745.

CLIWA-NET, 1.3.2000 – 28.2.2003. Regional scale netwerk rond Cabauw als onderdeel van een netwerk van 12 stations in Europa.
CLIWA-NET aims at the improvement of the parameterization of cloud processes in atmospheric models with a focus on vertically integrated cloud liquid water and vertical structure of clouds. To achieve this goal a prototype of a European Cloud Observation Network (ECON) consisting of ground-based stations and satellite measurements was to be set up. It operated successfully during three enhanced observation phases (EOP) all part of BRIDGE – the major field experiment of BALTEX.
…….
The prototype of a European Cloud Observation network (ECON) was successfully implemented during three enhanced observational periods (CNNI: August/September 2000; CNNII: April/May 2001 and BBC: August/September 2001 (BBCI, the first BBC campaign)). To successfully implement ECON existing observation systems (microwave radiometer and auxiliary instruments) were distributed in a continental scale over the BALTEX modelling region and a regional scale network in the Netherlands.
Uit: Crewell, S., C Simmer, A. Feijt and E. van Meijgaard, (Eds.) 2003: CLIWA-NET BALTEX BRIDGE Cloud Liquid Water Network Final Report. International BALTEX Secretariat Publication ISSN 1681-6471, No. 26, July 2003, pp 61.

CLIWA-NET Objective
Problem to be solved:
Improved observations for atmospheric models to detect climate change, understand the present climate and predict climate variability.
Objectives and approach:
CLIWA-NET focuses on observations of cloud liquid water and vertical structures, and the evaluation and improvement of model parameterization's. The specific objectives are: implementation of a prototype of a European Cloud Observation Network; development of an adequate observing system for the detection of icing conditions for aircraft; objective evaluation and improvement of state-of-the-art cloud parameterization's for climate and

weather forecast models, with a focus on integrated cloud liquid water and vertical structure of clouds; design of a "low cost" microwave radiometer in co-operation with industry (SME); contribute to BALTEX/BRIDGE. The CLIWA-NET project will establish a prototype of a European cloud observing system by coordinating the use of existing, ground-based passive microwave radiometers and profiling instruments. In total 12 stations within the BALTEX modelling area will contribute to this network. An unprecedented microwave radiometer calibration campaign will be organized in combination with a regional network (100x100 km2). The data from the ground-based remote sensing instruments will feed high quality cloud information, with high temporal but poor spatial resolution, into the calibration of satellite-based estimates of cloud water content with high spatial resolution. New procedures will be developed to fully exploit the synergy. The retrieved CLIWA-NET data sets will be used for an objective evaluation of the performance of state-of-the-art cloud parameterization schemes. The focus will be on liquid water path (LWP) and vertical structure of cloud amount and cloud water.
Three lines of research will be pursued:
(i) evaluation of cloud related output from leading European atmospheric models;
(ii) investigation of the sensitivity of model cloud parameters to the employed horizontal grid spacing in the meso-scale range from (1-10 km;
(iii) to develop/improve/test cloud parameterizations and underlying assumptions. The cost and complexity of the available microwave radiometers presently hamper the implementation of an operational network. For this reason, the design of a low-cost operational microwave radiometer by a commercial company is included in this project.
Expected impact:
As part of the international Global Climate Observing System, and within BALTEX, the project will make a major contribution to our ability to understand the atmospheric system, with benefits in improved cloud forecasts for the general public, air transport, solar energy, construction industry, and civil protection (floods and droughts).
Project reference: EVK2-CT-1999-00007
Uit: European Commission Cordis projectbeschrijving
web-site: http://cordis.europa.eu/project/rcn/52081_en.html
Coördinatie KNMI, verder instituten uit BRD, Finland, Frankrijk, UK en Zweden.

CNN I en CNN II, Wolken waarneem netwerk, waaronder Cabauw. Extensive Observation Periods (EOP's) in 2000 en 2001
2.1 CNN Network
A network of ground based stations within the BALTEX modeling area will be operated during two campaigns. Since both periods are also BALTEX Enhanced Observation Periods (EOP 1, 3) additional data sets will be available (e.g. radiosondes):
August 1 to September 29, 2000 (CNN I)
April 2 to May 31, 2001 (CNN II)
Uit: Van Lammeren, A., S. Crewell, A. Macke, A. Feijt and E. van Meijgaard, 2000: BALTEX Cloud Cloud Liquid Water Network: CLIWA-NET Kick-Off Workshop Report.
http://projects.knmi.nl/cliwa-net/results/publications/kick-off_workshop_report.pdf

OBSERVATIONAL SETUP
Within CLIWA-Net a prototype of ECON (European cloud observational network) is implemented by coordinating the use of existing, ground-based passive microwave radiometer instruments and profiling instruments. High quality cloud information from this network at very high temporal resolution but poor spatial resolution serves as calibration of satellite- inferred estimates of LWP at high spatial resolution. The CLIWA-Net Network (CNN) consisted of twelve stations (Figure 1) and was operated in two continental-scale experiments in August/September 2000 (CNN I) and in April/May 2001 (CNN II).

Uit: Van Meijgaard, E., A. Mathieu, A. Feijt and S. Crewell, 2002: The European BALTEX Cloud Liquid Water Network: An overview. 11th Conf. on Cloud Physics of the AMS, June 3, 2002, 2.1.

MV20, 4 mappen

CDN, Cloud Detection Network, ook CDS, Cloud Detection System genoemd. Netwerk van een tiental stations met Cabauw als centraal punt. De opzet van het netwerk dateert uit de tijd van TEBEX (MV12), Stammes et al., 1994. Later was het een onderdeel van aan BALTEX gerelateerde meetcampagnes. De mappen in dit archief beslaan de periode 2000 – 2004.

Abstract

To understand and model the radiative transport in a cloudy atmosphere information on the cloud height and optical thickness is indispensable. Therefore retrieval techniques for cloud parameters are developed for the AVHRR, ATSR and the future MSG. Mainly synoptic observations are used for validation despite their subjective nature and varying quality. To validate advanced cloud parameter retrieval methods objective physical measurements are. necessary. At KNMI retrieval methods of cloud fraction, cloud top temperature, optical thickness and LWF from AVHRR observations are developed. Much effort is put in building an infrastructure for validation. The retrieval methods are validated with a two-year data set from the KNMI Cloud Detection System (CDS). Detailed analysis is performed with observations from the CLARA-campaigns, when a number of advanced remote sensing and in-situ instruments were added to the CDS. The collocated lidar, radar, microwave radiometer and aircraft measurements from the CLARA data set allow for the evaluation of the assumptions in cloud parameter retrieval methods. Furthermore, the study presented here shows that combining measurements from lidar, radar and AVHRR provide information on cloud properties that cannot be retrieved from any of these instruments alone.

1.1 The KNMI Cloud Detection System (CDS)

The CDS consists of a network of 10 ground stations for remote sensing within a 120x120 km^2 area and a processing environment for AVHRR and Meteosat measurements (Stammes et al.1994). The instruments at each station are: lidar-ceilometer (904-911 nm), narrow band, narrow beam infrared-radiometer (9.6 - 11.5 µm), pyranometer (0.3 - 3.0 µm), precipitation detector and rain gauge. AVHRR measurements are analyzed with a derivative of the AFOLLO scheme (Saunders and Kriebel, 1988). Cloud parameter retrievals from Meteosat imagery are performed with the MetClock-scheme (De Valk, 1997). The complete CDS was operational from October 1994 until December 1996. The CDS-measurements are used to obtain the following cloud parameters: cover fraction, temperature, optical thickness, liquid water column and geometry (Feijt and Van Lammeren, 1996).

Uit: Feijt, A., H. ten Brink, S. Jongen, A. van Lammeren and H. Russchenherg, 1999: Validation of Cloud Parameter Retrieval Methods with Objective Ground Based Measurements. Phys. Chem. Earth (B), **24**, No. 3, pp. 173-176.

MV21, 1 map
EUCAARI IMPACT, mei 2008. KNMI Cabauw, TNO, RIVM, ECN, ESA, TUD, WUR, UU en instituten uit Finland, Duitsland, Engeland, Frankrijk, Italië, Noorwegen en Polen. Betreft onderzoek naar de invloed van aerosol op klimaat. IMPACT is een deel-experiment van EUCAARI.
Abstract. In this paper we describe and summarize the main achievements of the European Aerosol Cloud Climate and Air Quality Interactions project (EUCAARI). EUCAARI started on 1 January 2007 and ended on 31 December 2010 leaving a rich legacy including: (a) a comprehensive database with a year of observations of the physical, chemical and optical properties of aerosol particles over Europe, (b) comprehensive aerosol measurements in four developing countries, (c) a database of airborne measurements of aerosols and clouds over Europe during May 2008, (d) comprehensive modeling tools to study aerosol processes from nano to global scale and their effects on climate and air quality. In addition a new Pan-European aerosol emissions inventory was developed and evaluated, a new cluster spectrometer was built and tested in the field and several new aerosol parameterizations and computations modules for chemical transport and global climate models were developed and evaluated. These achievements and related studies have substantially improved our understanding and reduced the uncertainties of aerosol radiative forcing and air quality-climate interactions. The EUCAARI results can be utilized in European and global environmental policy to assess the aerosol impacts and the corresponding abatement strategies.
Uit: Kulmala, M., R. Boers, J.P. Veefkind, G.-J. van Zadelhoff and ~120 co-authors, 2011: General overview: European Integrated project on Aerosol Cloud Climate and Air Quality interactions (EUCAARI) – integrating aerosol research from nano to global scales. Atm. Chem. Phys., **11**, pp. 13061–13143.

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Assessment and quantification of the aerosol indirect climatic effects: Experimental studies to quantify the aerosol direct, semi-direct, first indirect, and second indirect effects (i.e. the impact of aerosol on boundary layer cloud life cycle and extent). Will involve experiments at the Cabauw supersite to measure turbulent fluxes, aerosol light-absorption, hygroscopic properties, cloud microphysical and radiative properties, and precipitation. LES simulations of boundary layer clouds forced by observations with diverse aerosol types. The effect of pollution plumes (tracked by models and satellite observations) on cloud radiative properties will be quantified. Lead KNMI.
Uit: Kulmala, M., A. Asmi, H.K. Lappalainen, K.S. Carslaw, U. Pöschl, U. Baltensperger, Ø. Hov, J.-L. Brenquier, S.N. Pandis, M.C. Facchini, H.-C. Hansson, A. Wiedensohler and C.D. O'Dowd, 2009: Introduction: European Integrated Project on Aerosol Cloud Climate and Air Quality interactions (EUCAARI) – integrating aerosol research from nano to global scales. Atm. Chem. Phys., **9**, pp. 2825-2841.

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