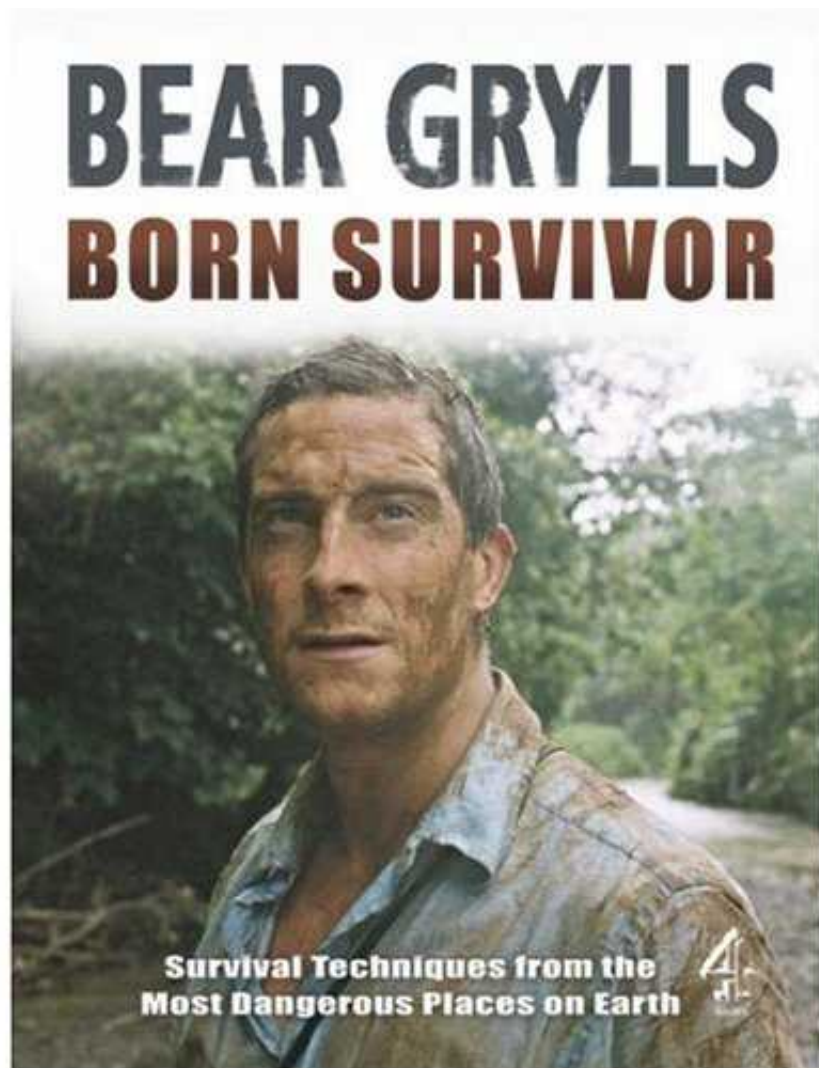
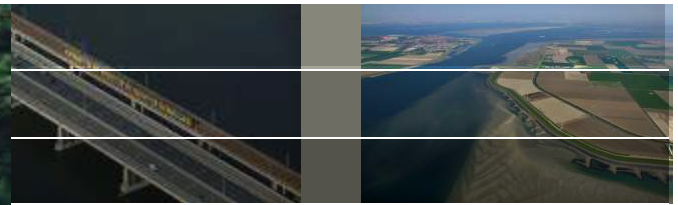




Veldmetingen (direct en veel) voegen veel toe! Overzicht nieuwe technieken in situ meten

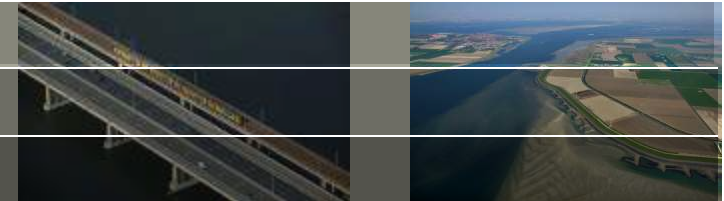
18 april 2012 Voorjaarsbijeenkomst PEHM





18 april 2012

Bare foot hydrologists



TIMES NATION
THE TIMES OF INDIA, NEW DELHI | FRIDAY, MARCH 12, 2010

RAILWAYS LOST 40% OF ITS BUSINESS DUE TO INSURGENCY, STRIKES AND BANDHS: MAMATA | 19

PUTIN LANDS IN INDIA SITUATION WITH MAN

Groundwater in 33% of India undrinkable

Iron, Fluoride, Salinity, Arsenic Beyond Tolerance Levels In Many Districts: Govt

Breaching Levels

- Iron levels in ground water higher than those prescribed in 254 districts
- Fluoride has breached the safe level in 224 districts
- Salinity beyond tolerance levels in 162 districts
- Arsenic levels higher than permissible limits in 34 districts
- Rajasthan, Karnataka, Gujarat worst affected

Twenty-one of the 26 districts of Gujarat were found to have dangerous salinity levels and 18 had breached safe fluoride levels. The Central Ground Water Board (CGWB) found 21 of 31 districts in the southern state of Karnataka to be contaminated with iron and 20 districts with higher levels of fluoride. In the case of Rajasthan, groundwater in 27 districts was found to be too saline, 30 districts had higher levels of fluoride and 28 suffered from iron contamination. The national capital does not fare any better with one of the country deploy water treatment systems before supplying water to homes, the costs of cleaning up as well as chances of contamination remain. Removal of heavy metals like arsenic, though, remains a problem the government is unable to tackle where the source of water is only from the ground aquifers. Experts have warned that lopsided water management has led to depletion of ground water aquifers and this, in many cases, has caused increasing contamination as people dig deeper into the ground and extract water.

NOT ENOUGH TO DRINK

Deltares

Bare foot hydrologists



Doel: schoon drinkwater voor iedereen

Probleem: drinkwaterkwaliteit nooit gecontroleerd in veel dorpen

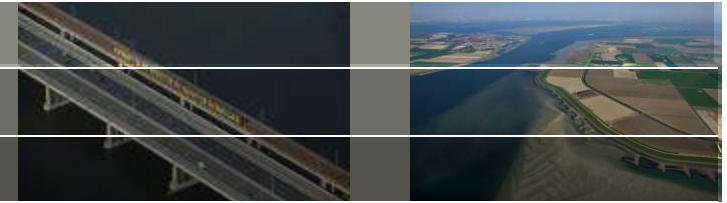
Verband grondwaterkwaliteit en verontreinigingsbronnen onbekend



Bare foot hydrologists



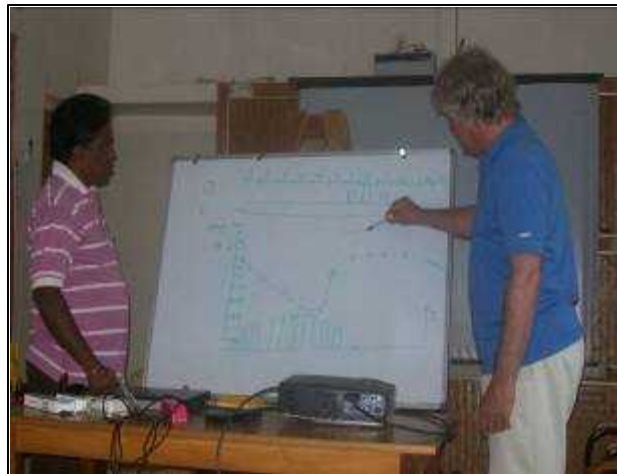
Bare foot hydrologists



1

Training of 40 barefoot hydrologist trainers

...in monitoring water quality...



... and protecting wells



Bare foot hydrologists

2

Development of a water monitoring Toolkit



Easy to use

Fast: 5 minutes

Decision support

Water level

Colour

Odour

EC (TDS)

pH

Chloride

Nitrate

Total hardness

Carbonate hardness

Sulphate

Iron

Residual chlorine

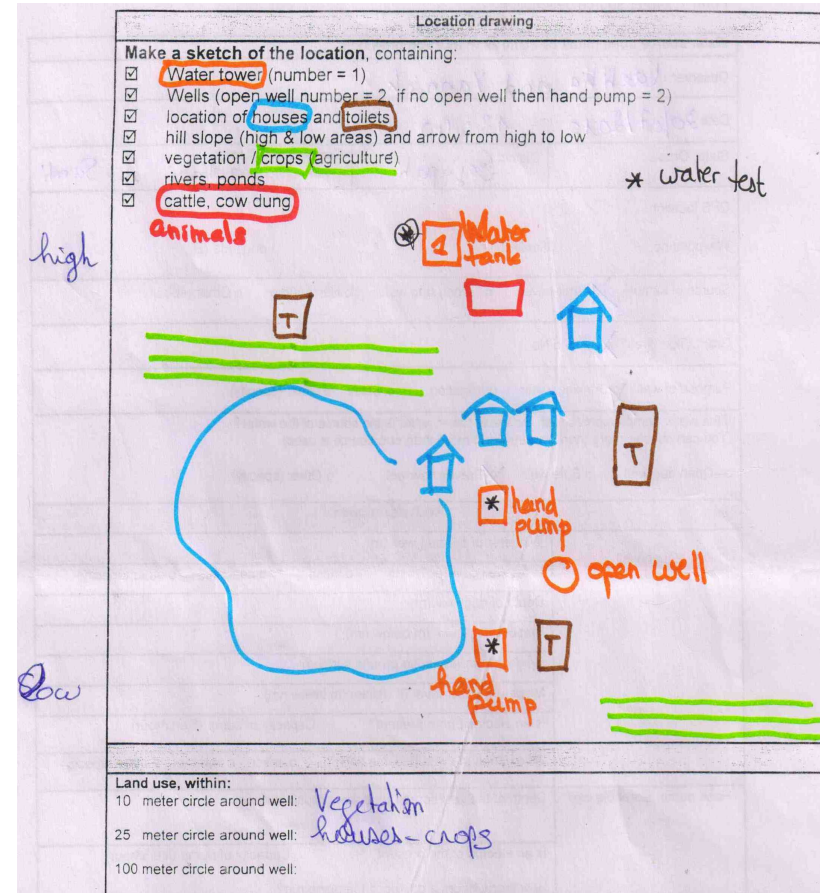
Bacteria



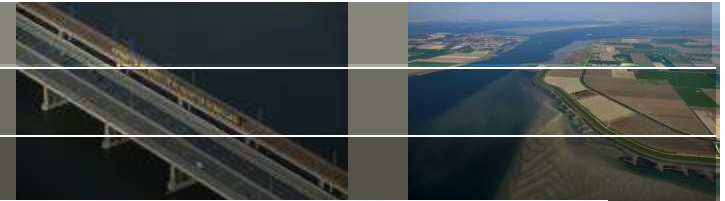
Results

3

A way to find sustainable well locations (clean and sufficient)



Sensortechnologie



HI 9828 van Envco



YSI 556 (Equipco)



Hydrion-10

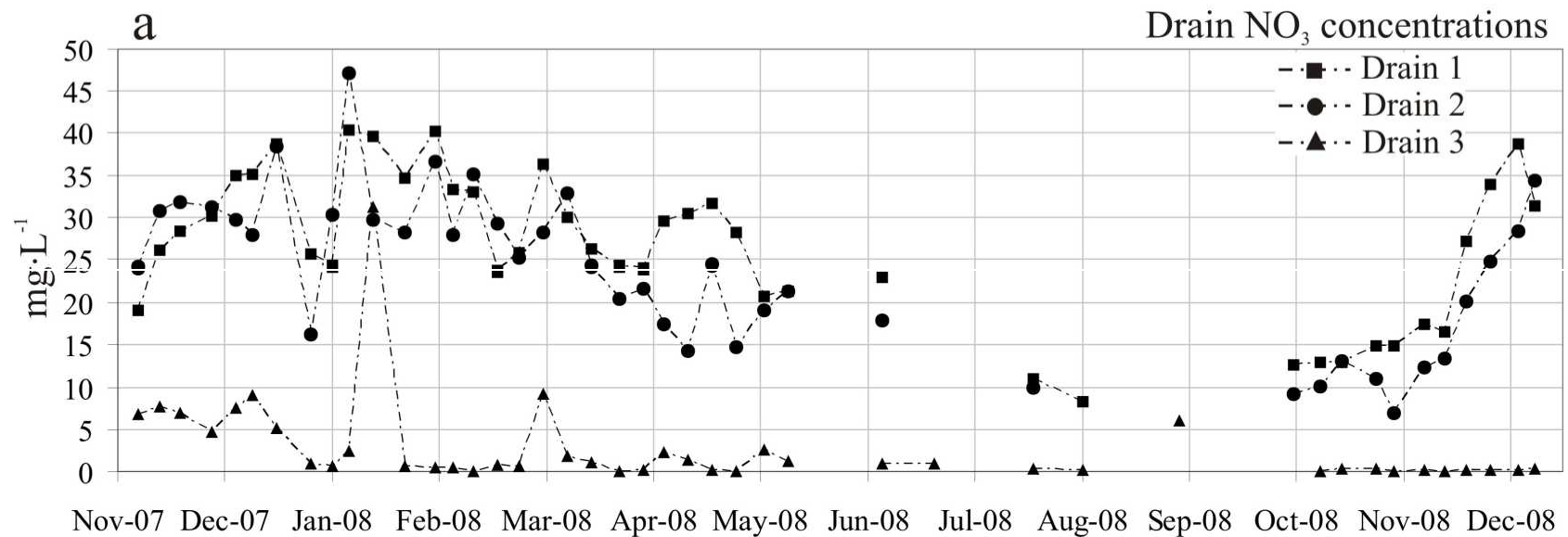
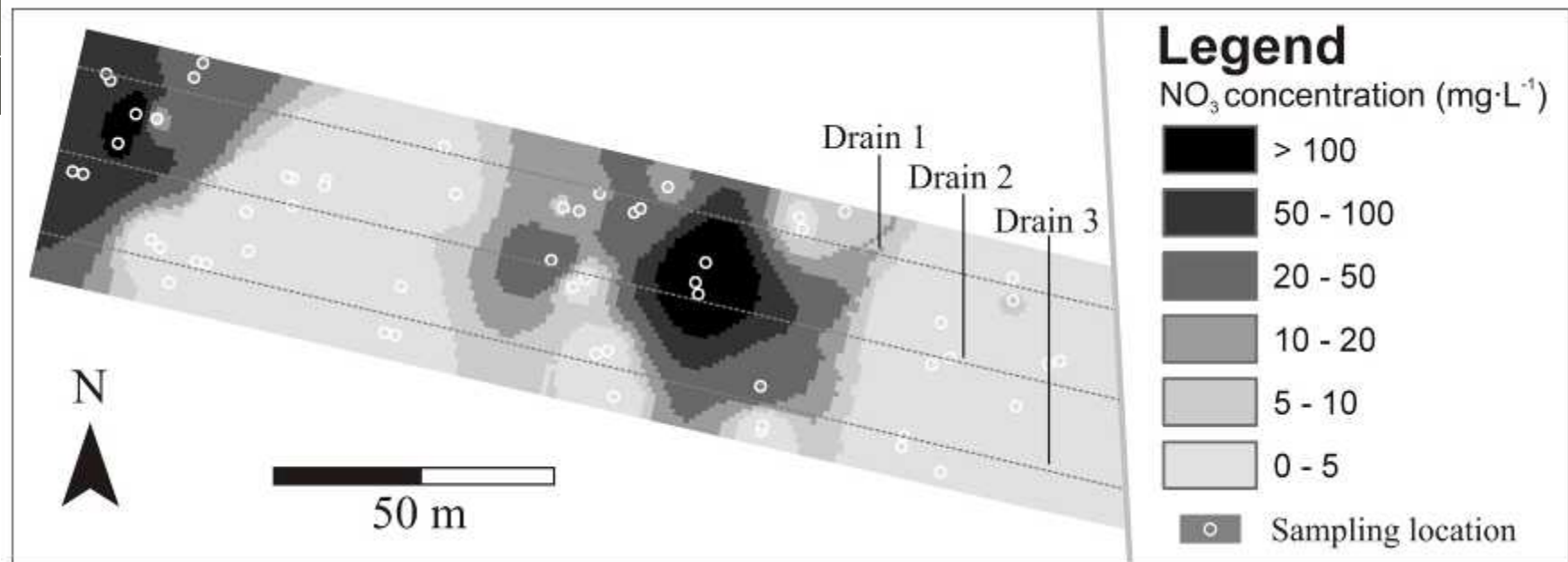


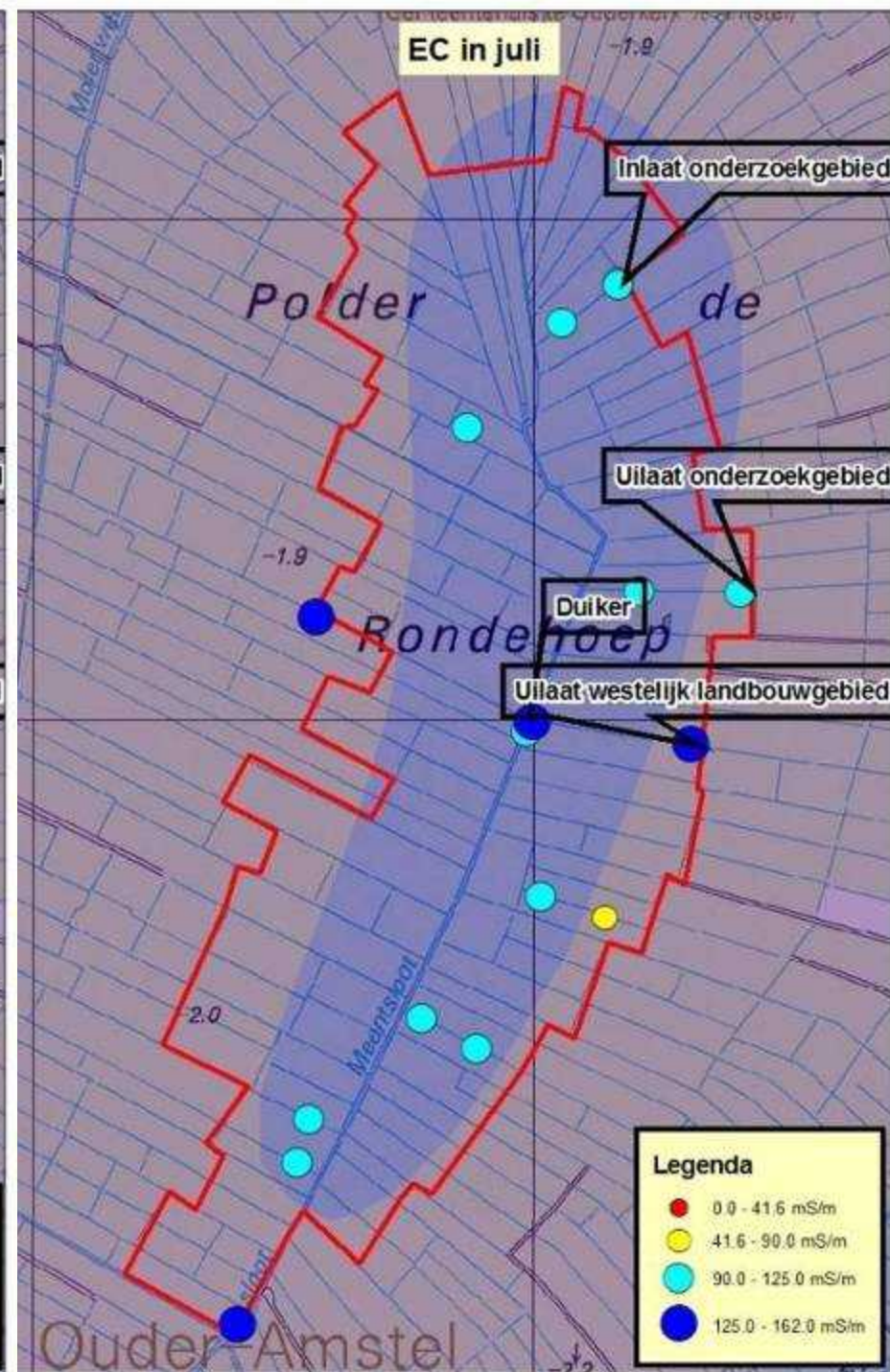
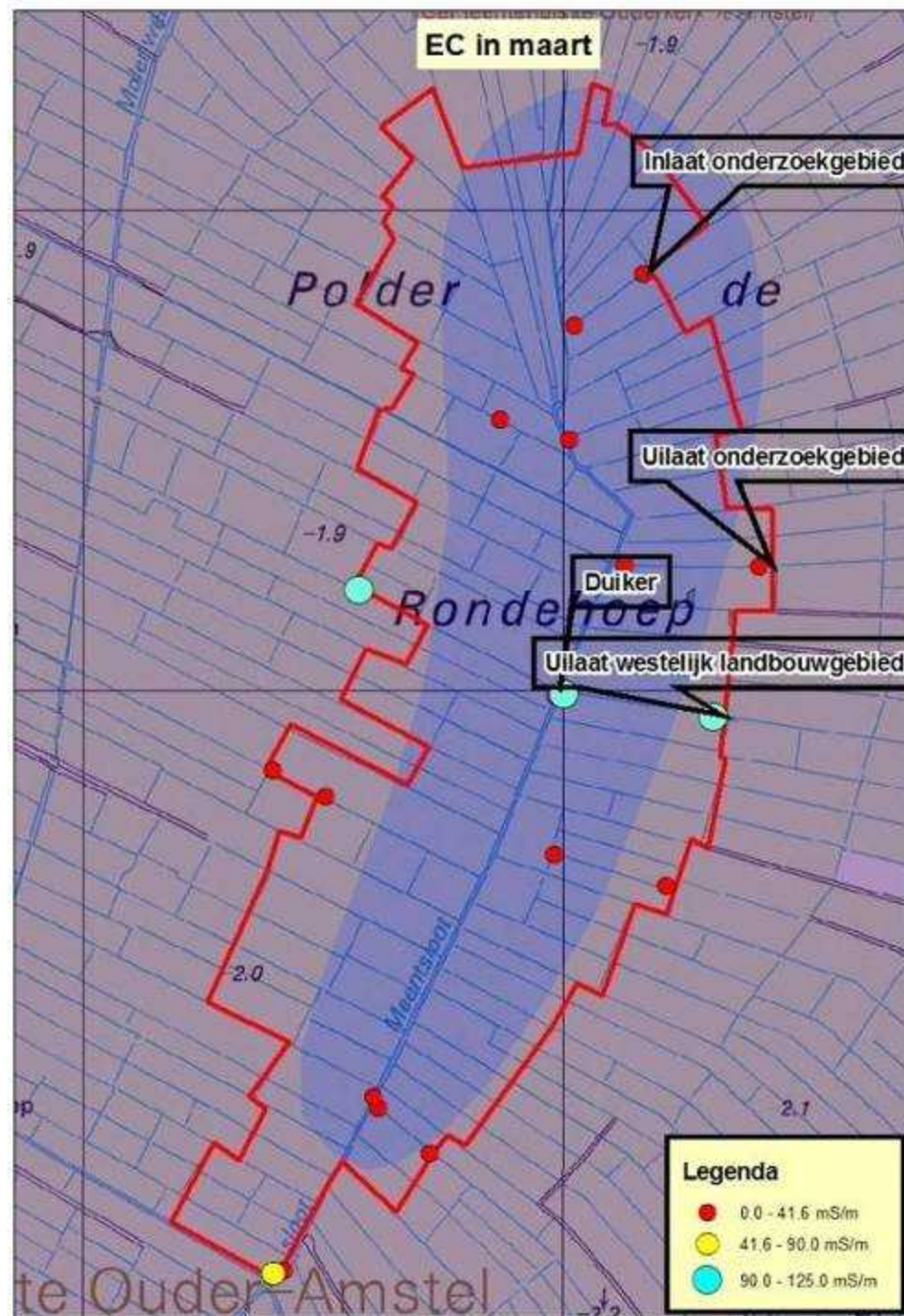
Hydrolab, Hach Lange

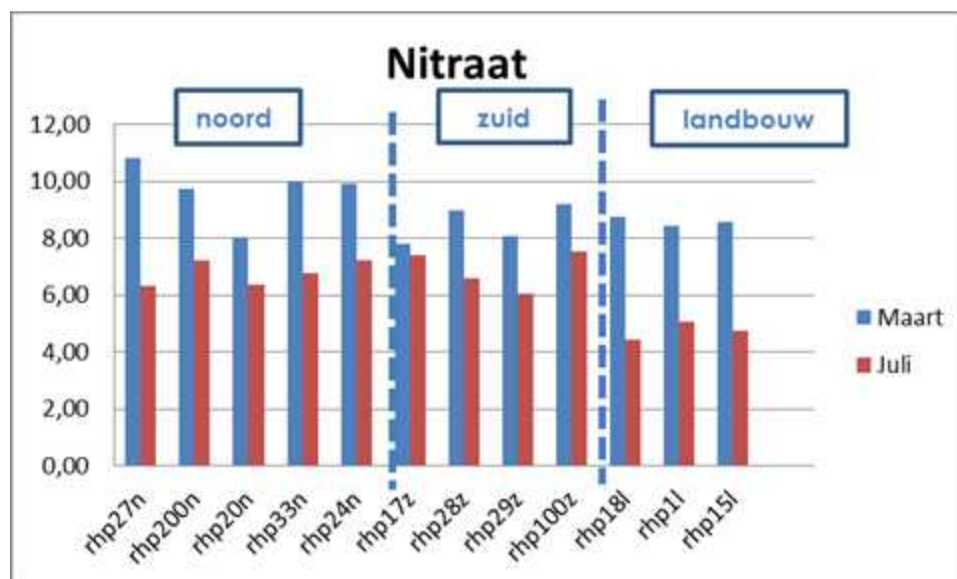
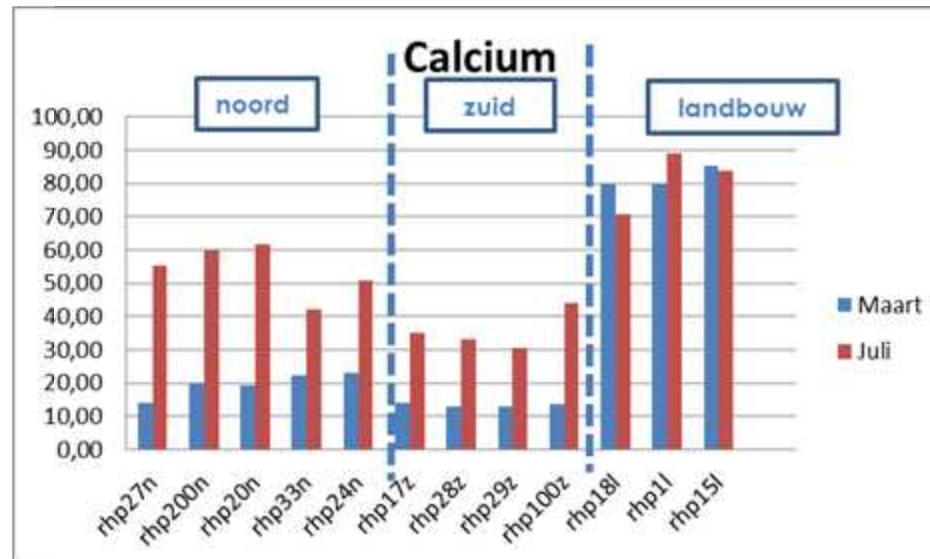
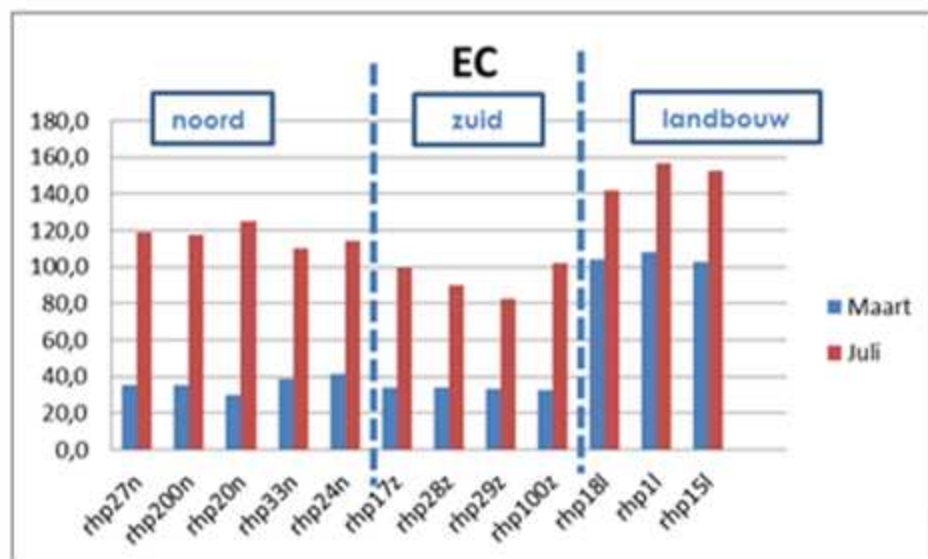
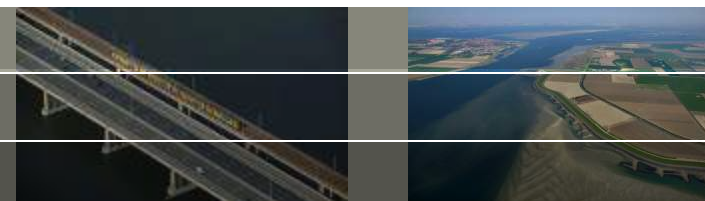


PDV 6000 (zware metalen)

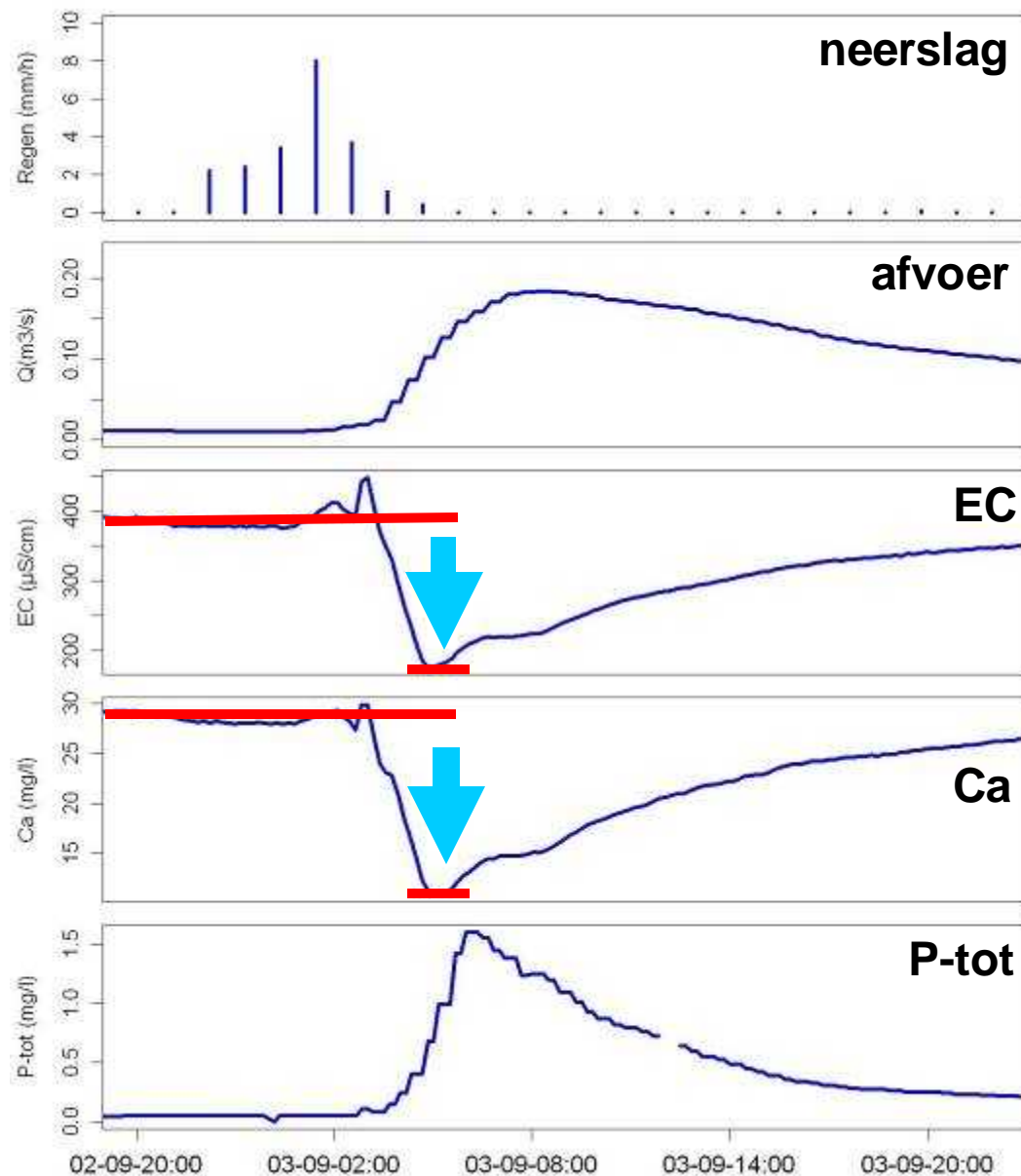
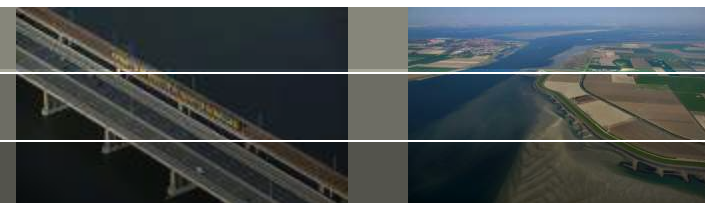
Deltares







Mengverhoudingen



EC daalt van 380 naar 170 $\mu\text{S/cm}$

Ca daalt van 30 naar 12 mg/l

EC neerslag: 20 $\mu\text{S/cm}$

Ca neerslag: 0,24 mg/l

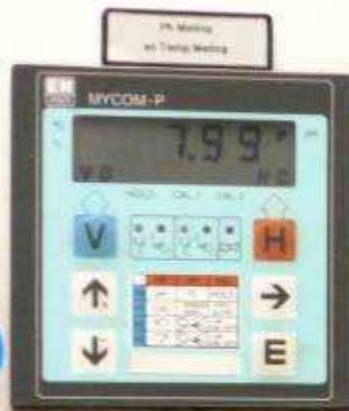


Tot ca. **62%** van
de afvoer is net
gevallen neerslag

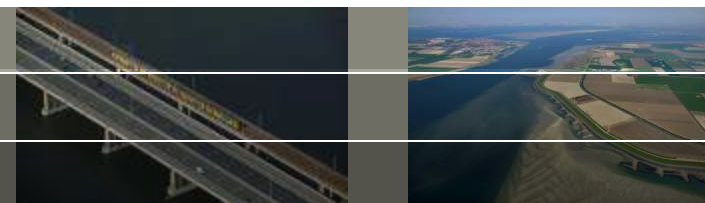
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Parameters



Conductivity

Ambient Light

Rhodamine WT

Temperature

Dissolved Oxygen

Chloride

pH and ORP

Turbidity

Chlorophyll a

Total Dissolved Gases

Cyanobacteria

Water Level

Ammonia / NH_3

Ammonium / NH_4^+

Barium / Ba^{2+}

Bromide / Br^-

Cadmium / Cd^{2+}

Calcium / Ca^{2+}

Chloride / Cl^-

Cyanide / CN^-

Fluoride / F^-

Fluoroboraat / BF_4^-

Jodide / I^-

Kalium / K^+

Koper / Cu^{2+}

Lithium / Li^+

Lood / Pb^{2+}

Natrium / Na^+

Nitraat / NO_3^-

Perchloraat / ClO_4^-

Sulfide / S^{2-}

Thiocyanaat / SCN^-

Zilver / Ag^+

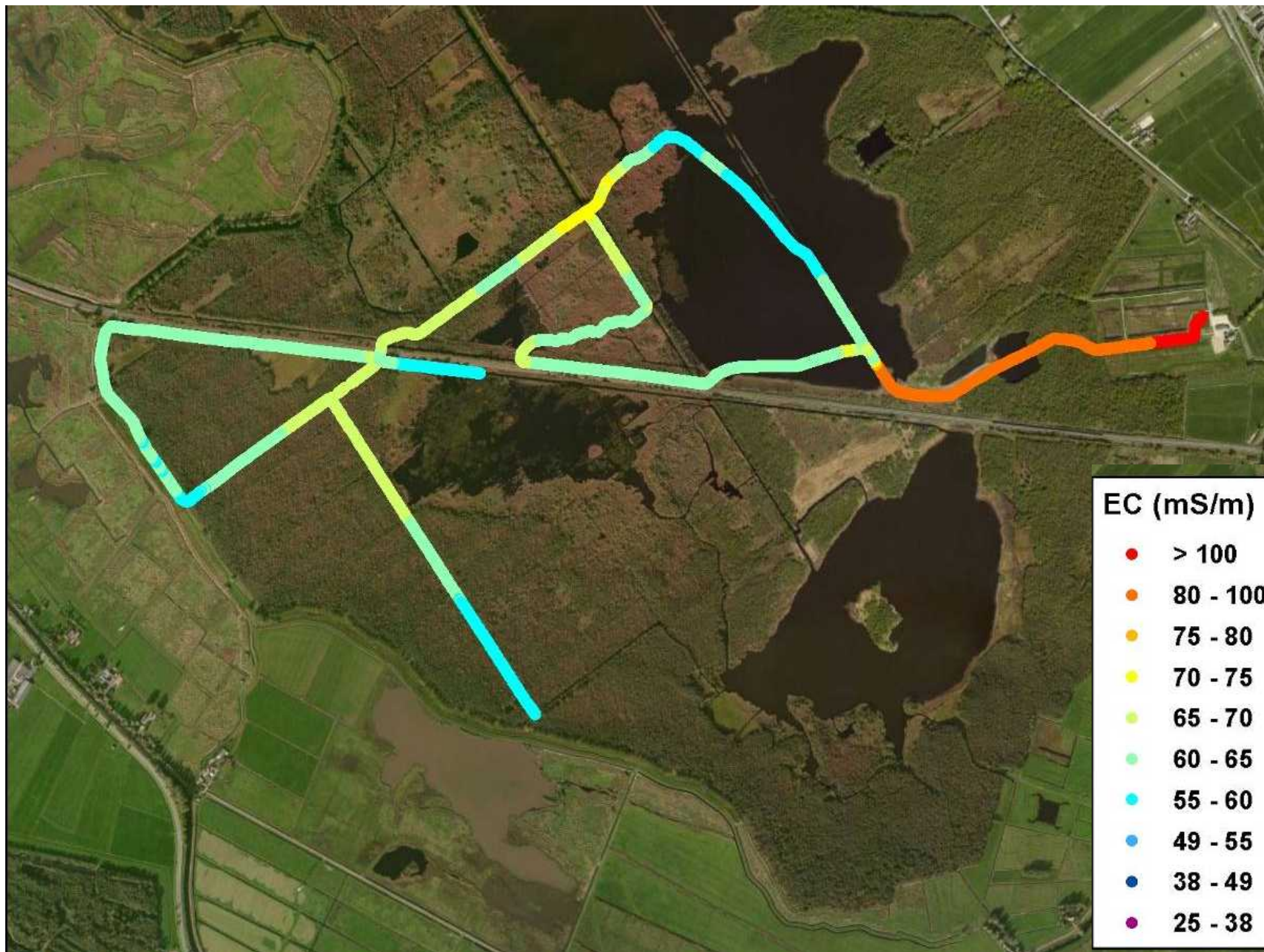


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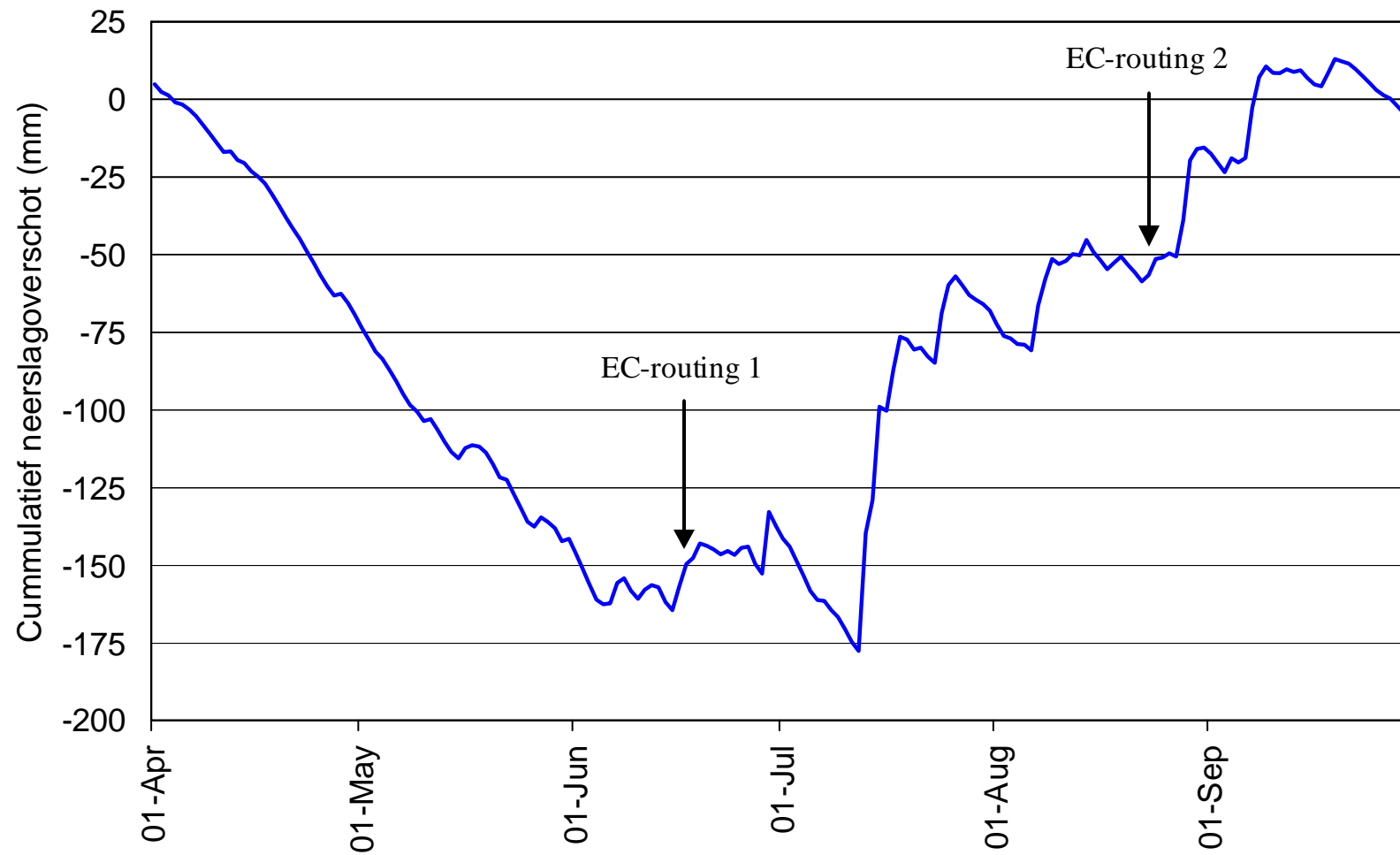


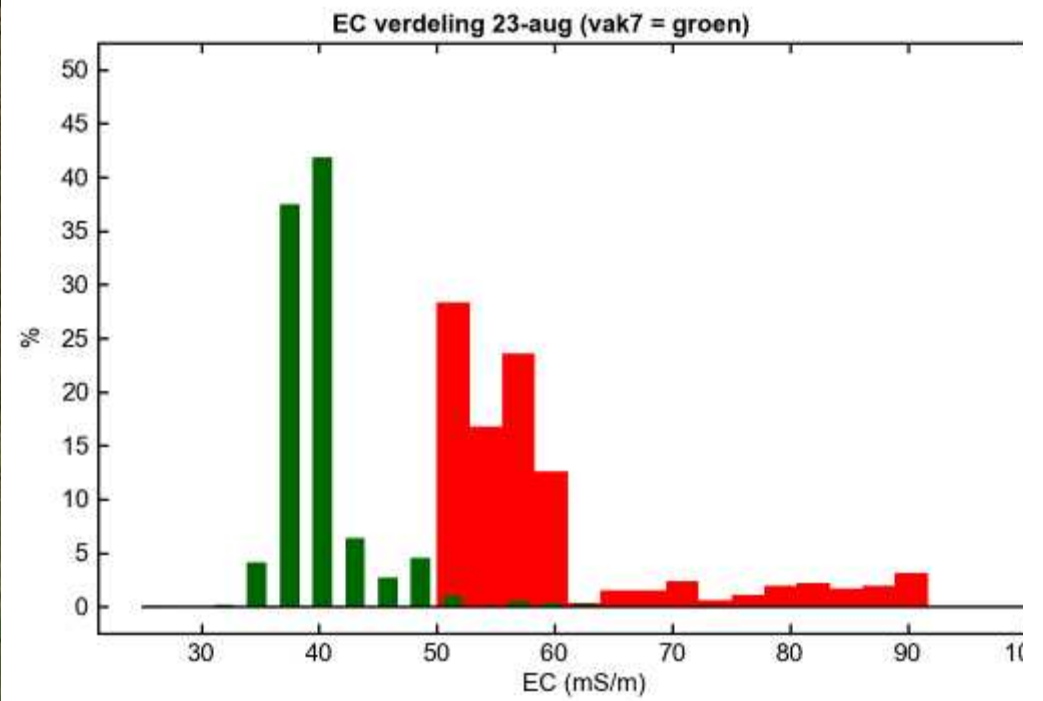
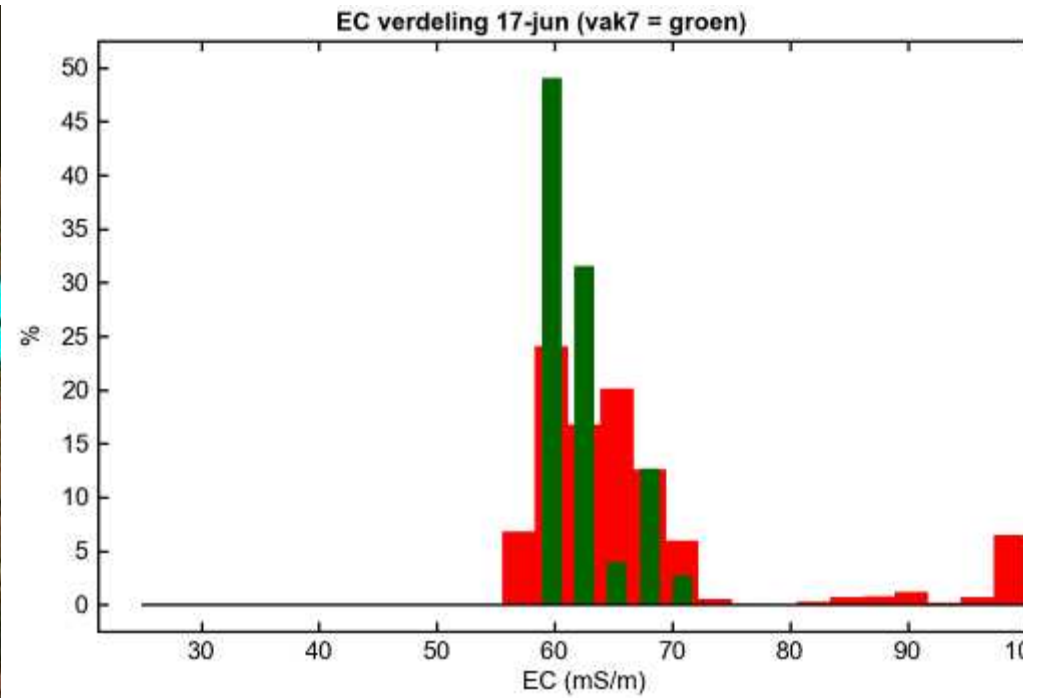






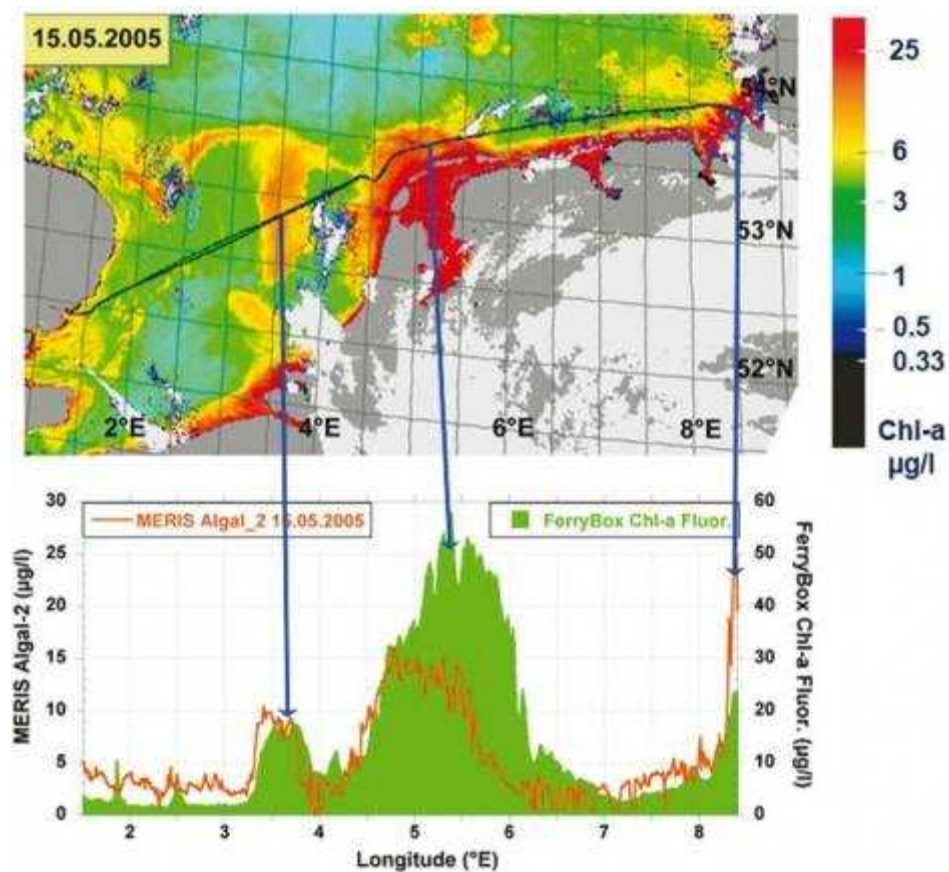
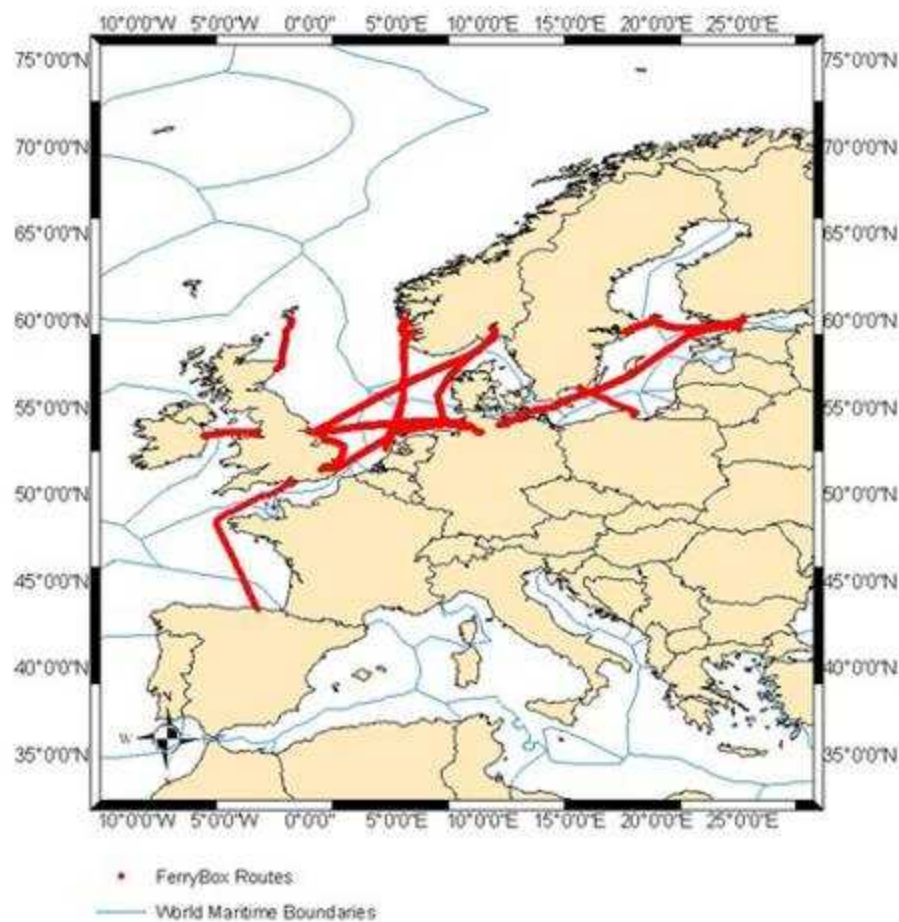
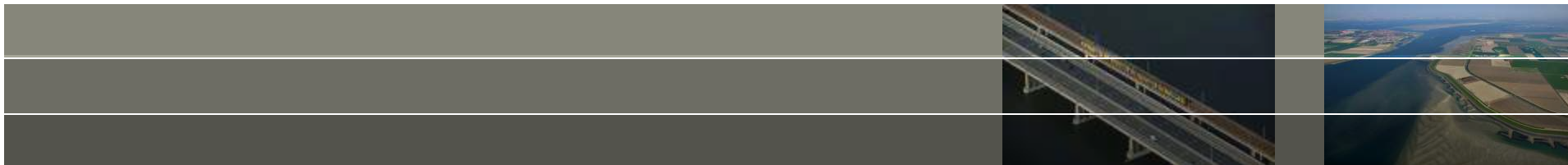
Naardermeer







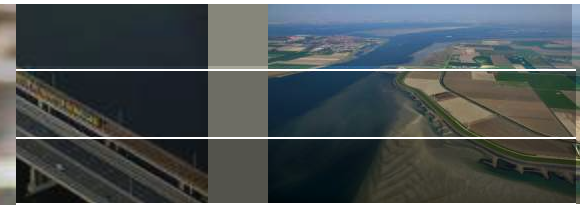




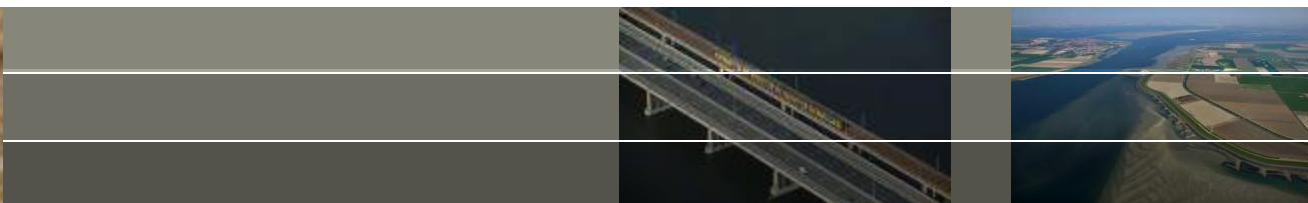
www.ferrybox.org

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18 april 2012





Bedankt voor jullie aandacht!

Met dank aan:

Veel plezier met de excursie!

Wiebe Borren
Martin Waanders
Astrid Medema
Ype van der Velde
Marijn Kuijper
Thomas Keijzer



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