Annual Report 2015

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Revision	Date	Description changes	Changed by
0	15/02/2016	First issue	RAV
1			
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1 GENERAL PROJECT INFORMATION

C-Power's wind farm is located on the Thornton Bank, approximately 30 km off the coast of Zeebrugge.
The construction of the project was developed in three phases.

Phase 1 (2007-2009), the pilot phase, consisted of six 5M (5 megawatts) wind turbine generators (WTG) on gravity base foundations (GBF).
The 30 MW installed capacity has been fully operational since end of June 2009.

Phase 2 (2011-2012) consisted of:

- the construction of 49 jacket foundations (JF);
- the installation of 30 WTGs of 6,15MW: 24 WTGs in sub area B and 6 WTGs in sub area A, mutually connected with 33/36 kV infield cables;
- the laying and connection of infield cables;
- the crossing of the 33/36kV infield cables with the Interconnector gas pipeline and the Concerto South telecom cable;
- the construction and installation of the offshore transformer station (OTS);
- de-connection works of 150/170kV cable A from D1 and connection to transformer station and the connection of a 33kV infield cable between OTS and D1;
- the installation of 2 subsoil 150kV onshore connections between the 150 kV offshore cables and the high voltage station "Sas Slijkens";
- the laying of the second 150kV offshore export cable B.

Phase 3 (2012-2013) consisted of:

- the installation of 18 WTGs (6,15MW) and the necessary connections with the offshore transformer station

The figure below outlines the different phases of C-Power's project.

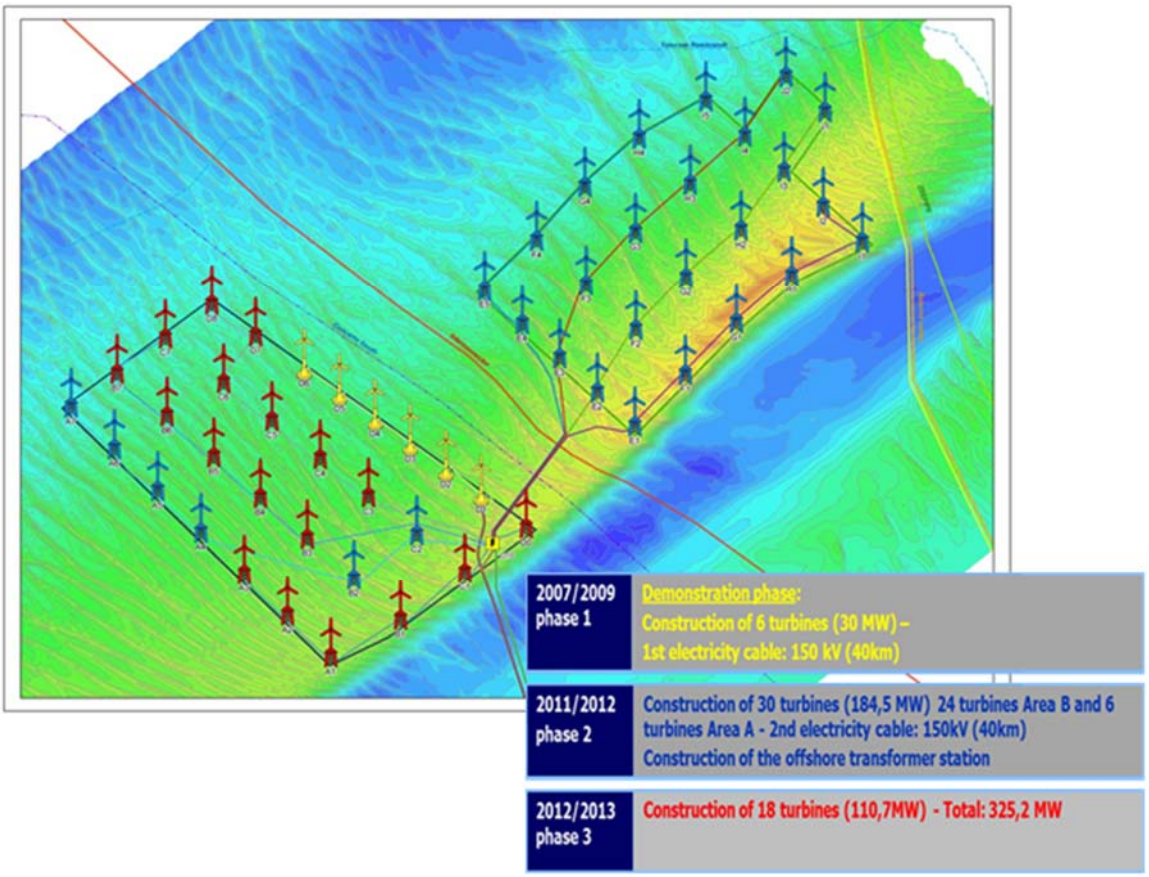

Figure 1: the different phases of C-Power's project

The complete project comprises 54 WTGs with a total rated power of 325 MW plus the supporting infrastructure. Full operation was accomplished by end of September 2013.

2 ACTIVITIES DURING 2015

2.1 MAJOR COMPONENT REPLACEMENTS

During 2015 several major components were exchanged. The vessels used for these operations were the DP2 SEP Neptune and the DP2 SEP Thor. Following major component replacements were executed:

- March to June 2015:
  - Rotor Bearings and Rotor Blades on D2, D3,D5,D6
  - Gearbox on turbines A6, A7
  - Transformer on D1
  - Rotor Bearing on F4
  - Rotor Bearing on A3

- September 2015
  - Transformer on H4
- November 2015:
  - Transformer on D6

3 CONSTRUCTION & OPERATION PERMIT CONDITIONS

All permit obligations are integrated and implemented in the daily management of the activities offshore by C-Power and its contractors.

The annual institutionalized Follow-up Committee ("Begeleidingscomité") took place on 27/04/2015. During this Follow-up Committee, the progress of the project has been discussed as well as the compliance of the operation and maintenance activities with the permit conditions.

On top of this regular and official reporting to the authorities, C-Power informs the federal and nautical authorities on a frequent, voluntary and transparent basis, including a regular dialogue with the relevant authorities via e-mail (status reports, coordinates, maps, plans, intruders tracking, etc..), ad hoc meetings, telephone exchanges etc..

An overview of the main permit conditions is described below.

Drifting or sunken objects

A detailed track record of the drifted and sunken objects is kept in C-Power's logbook.

12/10/2015 – two oil drums were spotted in the area of E5 en F4. Drums were taken aboard by Simon Stevin and crew vessel Don Quixote.

Cables

The depth of burial of the cables is regularly surveyed by C-Power. The results of these surveys are submitted to the members of the Follow-up Committee.

During November 2014 (28/11/2014) a special follow-up committee was organized to discuss the evolution of the burial depth of the export cables. At the follow-up committee of 27 April 2015, all parties agreed that based on the results of the study made by C-Power the frequency of export cables survey can be decreased to one every three years. Next export cable survey is scheduled in 2017.

Monitoring

Retribution monitoring activities BMM
The invoice related to the mandatory monitoring activities in C-Power's concession area in 2015 amounted to 8.822,44 EUR and has been paid to BMM. Payments occurred throughout the year 2015 in May.

Meteorological parameters
Meteorological data (wind speed, wind direction, wave height, wave period, tide, pressure, temperature, visibility) measured in real time on C-Power's offshore transformer platform are available on "http://meteo.c-power.be". Next to that C-Power also engaged into a data exchange program with the 'Vlaamse Hydrografie' in order to have also meteorological data from Akkaert and Westhinder to support daily operations and safety.

Risks & Safety

Internal emergency plan
Was initially released May 2014, was only available in Dutch. We did review the complete procedure and made also the translation to English. Contact persons were also reviewed. No major changes have been made in the procedure.

Emergency exercises
06/2015: Medivac from WTG to vessel and from vessel to Heli. Was planned with the 40th squadron, due to change in their planning they could not participate to the drill. MRCC did cooperate in the drill.
09/2015: Environmental incident in cooperation with the FOD environment
09/2015: Planned Medivac from OTS was planned, due to bad weather drill was cancelled
10/2015: Second attempt to Medivac drill from the OTS, also been cancelled due to weather, is postponed to 2016.
During 2015: we executed 5 MOB trainings at sea
Also we started a training program to train every technician how to execute a MOB rescue. This training program consist in 4 difficulty levels, 5 trainings in the easiest level are executed.
For 2016 2 ERP drills will be planned in cooperation with ISEC.

Harmful substances

Register updated when new substances present or existing substances are replaced by other.

Permit compliance procedures

An overview of permit conditions and a full copy of all permits have been integrated in all contracts with third parties operating offshore. All contractors are consequently fully informed on the mandatory permit conditions.
C-Power coordinates and supervises the permit conditions' compliance of the respective contractors.

During major component replacements, the planning of all construction related activities offshore has been communicated via a daily report sent to all relevant authorities by the Vessel Marine Coordinator. This included the contact details of C-Power's point of contact for the authorities, daily updates about offshore operations and changes in the planning.

All incident reports from contractors as well as from C-Power's staff are registered and kept on C-Power's internal server as the HSE register.

Wind Turbine data; Energy Production; Wind Turbine Availability: Confidential information

Data regarding energy production, availability and number of stop and maintenance hours can be found in Attachments 6.1 to 6.5. **These data are to be treated as confidential**.

4 ENVIRONMENTAL MONITORING ACTIVITIES

Bathymetric surveys

Bathymetric surveys of the gravity base foundations and of infield cables and jacket foundations in Area A on the Thornton Bank have been executed in June 2015 in order to monitor the burial depth of the cables, the evolution of the morphology of the seabed around the foundations.

The evolution of specifically the scour around the piles has been evaluated. The report is attached as Annex 6.6. The conclusion is that the scour depth has reached equilibrium for all locations in Area B and for the majority of the locations in Area A. For the remainder of the locations the scour depth is close to equilibrium. At all locations the equilibrium reached is within the limits specified.

C-Power has also installed on the shallowest location G2 a scour monitoring frame around the southern pile. This scour frame measured on a continuous basis the variations of the scour depth around the pile. The measurement campaign was completed end 2014; the measurement equipment is still at its location.

5 HEALTH, SAFETY AND ENVIRONMENT (HSE)

Main events and actions:

In January we had a small environmental incident due to a SF6 leak on a high voltage switchgear in turbine F1. This has been reported to the Follow-up Committee of April 2015.
The root cause was an installation failure on a cable plug. C-Power started a measurement campaign to detect similar failures in an early state. 90% of the cable plugs have been investigated and no signs of a failure were detected.

In the first half of 2015 C-Power had to deal with some minor incidents and near misses that triggered the C-Power management to take additional actions.

A specific campaign called Safety Culture and Health Improvement Campaign ("SCHIC") was launched, together with our main contractor Senvion and its sub-contractor CMI.
In this project we defined 5 workgroups handling a safety aspect that needs improvement according to the 3 companies.

1. Establish strong Health & Safety Communication
2. Develop existing Safety hazard Observations
3. Stimulate & develop Safety Leadership and People Skills/Management
4. Improve work preparation and work permit
5. Enhance technical knowledge and skills

A dedicated Safety day held on 30 October kicked off the project. This campaign will continue throughout the coming years.

In 2015 additional attention was given to the review of some important safety procedures e.g. review of the HV switching guidelines and the review of all switching schedules for the turbines, in close cooperation with Senvion.

C-Power also decided to hire a third Vessel Marine Coordinator to cover the work load during the maintenance season in a more efficient manner.

OHSAS18001

New certification obtained 04/2015, next audit planned in 04/2016.

Remote Monitoring system

C-Power has a 24-hour SCADA (Supervisory Control and Data Acquisition) surveillance system in operation. The SCADA system enables both the operational management of C-Power and Senvion to have a complete overview of all turbines.
On each wind turbine, 2 cameras are installed at the height of the boat landings. The camera images are sent through in real time to the operational center in Ostend and are stored for 24 hours. Also the Offshore transformer Station is equipped with 4 HD camera's covering the whole park.

6 ANNEXES

6.1 AVAILABILITY PER PHASE ON MONTHLY BASE

6.2 PRODUCTION – LOW WIND – STOPS – MAINTENANCE HOURS

6.3 PRODUCTION PER MONTH PER PHASE

6.4 PRODUCTION PER YEAR PER TURBINE

6.5 WIND SPEED AND WIND ROSE

6.6 MULTIBEAM ANALYSIS 2015 – AREA A

Memo

Date:	02/10/2015
To:	Stijn Deprez (C-Power)
Author:	TDB/VIK
Document ref:	I/NO/11469/15.415/TDB/

Subject: 11469 Multibeam analysis 2015 - Area A

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1. INTRODUCTION

The concession zone of C-Power's offshore wind farm at the Thornton Bank is located in the North Sea at a distance of approximately 27km from the Belgian coast. The wind farm (Phases I, II and III) contains 54 WTGs with a combined capacity of *ca*. 325MW, and with an individual WTG capacity of 5MW (Phase I) and 6MW (Phases II & III). The wind farm is also equipped with one offshore transformer station (OTS). Two 150kV export cables bring the wind-generated electricity on land. The last turbine of the offshore wind farm was installed early July 2013.

Figure 1-1 shows the different phases for the construction of the offshore wind farm. Six gravity based foundations were erected in the pilot phase of the Thornton Bank project between 2007 and 2009. These turbines have rock dump scour protection and are not further discussed in this memo.

In the period 2011 – 2013, the offshore transformer station and 48 additional turbines were installed on jacket foundations. These quatropods are designed to allow scour to a certain level. In this memo, the evolution of the scour depth is discussed based on the available multibeam data.

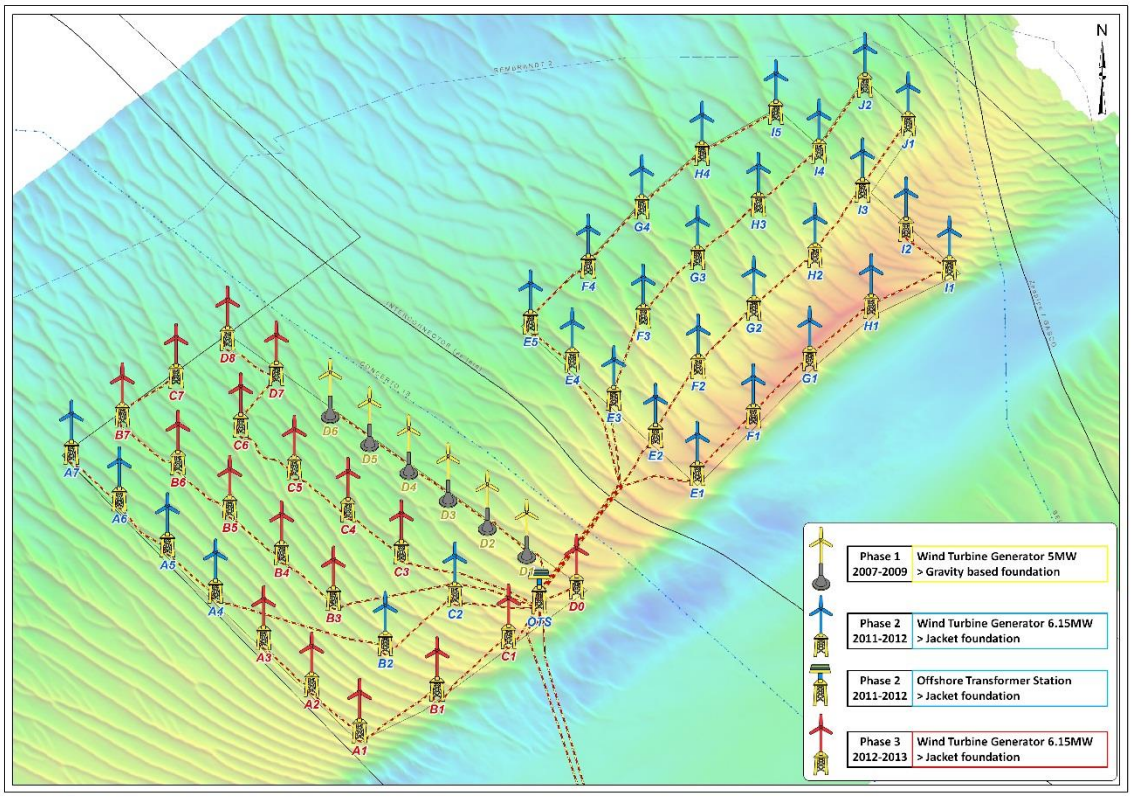


Figure 1-1: Overview of Construction Phase I – III

2. AVAILABLE DATA

Table 2-1 lists the surveys which fully cover the area around the jacket foundations. Other surveys envisaged the infield cable trajectories and thus only cover the seabed around the jacket foundation partially.

The multibeam survey carried out in june 2015 only covers the WTG foundations in area A.

Table 2-1: List of available surveys around the jacket foundations in Area A and B.

SURVEY	AREA A		AREA B	
	First measurement	Last measurement	First measurement	Last measurement
Insurvey dredging works	07/03/2011	15/04/2011	05/02/2011	20/03/2011
Outsurvey dredging works	21/03/2011	04/06/2011	22/03/2011	20/04/2011
Construction monitoring survey	14/08/2011	10/09/2011	11/06/2011	09/09/2011
Construction monitoring survey	08/11/2011	02/12/2011	28/10/2011	28/11/2011
Construction monitoring survey	25/01/2012	25/01/2012	25/01/2012	25/01/2012
Construction monitoring survey	09/03/2012	09/03/2012	09/03/2012	09/03/2012
Construction monitoring survey	27/05/2012	27/05/2012	27/05/2012	27/05/2012
Construction monitoring survey	17/07/2012	28/07/2012	15/07/2012	28/07/2012
Construction monitoring survey	01/09/2012	01/09/2012	11/09/2013	11/09/2013
As-built survey	30/09/2012	30/09/2012	02/10/2012	06/10/2012
Yearly monitoring survey	09/07/2013	17/07/2013	12/07/2013	15/07/2013
Yearly monitoring survey	11/10/2014	11/10/2014	11/10/2014	11/10/2014
Yearly monitoring survey	29/06/2015	29/06/2015	-	-

In Table 2-2 an overview of the different jackets in area A and B is given. The locations of these different jackets are shown in Figure 1-1.

Table 2-2: Overview jackets in Area A and B.

Jackets Area A	Jackets Area B
A1, A2, A3, A4, A5, A6, A7 B1, B2, B3, B4, B5, B6, B7 C1, C2, C3, C4, C5, C6, C7 D0, D7, D8 OTS	E1, E2, E3, E4, E5 F1, F2, F3, F4 G1, G2, G3, G4 H1, H2, H3, H4 I1, I2, I3, I4, I5 J1, J2

3. ANALYSIS

Per jacket, a plot of the evolution of the scour depth in time is made. All plots can be found in Annex A.

As an example, the plot of jacket A1 is discussed here (see Figure 3-1).

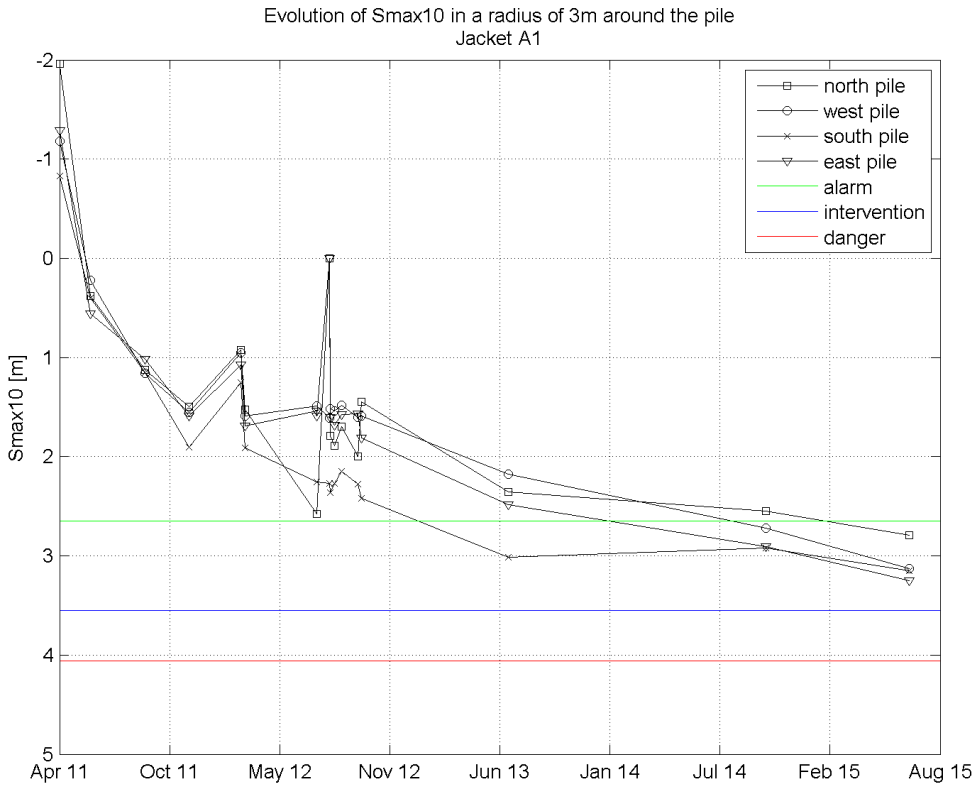


Figure 3-1: Evolution of the scour depth (S_{max10}) around the piles of Jacket foundation A1.

Figure 3-1 is based on all the available multibeam surveys (listed in Table 2-1), performed before, during and after installation, and illustrates the scour development S_{max10} (average of the 10 deepest points measured in an area with a radius of 3 m around the centre of a pile) around the 4 piles of jacket foundation A1 in function of time. The parameter S_{max10} is relative to PDTDL_ab. Positive values of S_{max10} indicate levels that are lower than PDTDL_ab, negative values of S_{max10} indicate levels higher than PDTDL_ab.

Furthermore, the level of the alarm, intervention and danger line next to the piles is indicated on the figure by the green, blue and red line respectively.

As shown in Figure 3-1, scour occurred around the 4 piles of the jacket foundation. In the previous memo (I/NO/14166/15.082/SUD/ v1.0) it was reported that the erosion process was not yet stabilized for jacket foundation A1 but seemed to go towards an equilibrium. However, the latest multibeam data indicate for this jacket foundation that the situation is not stable yet and some scour is still occurring.

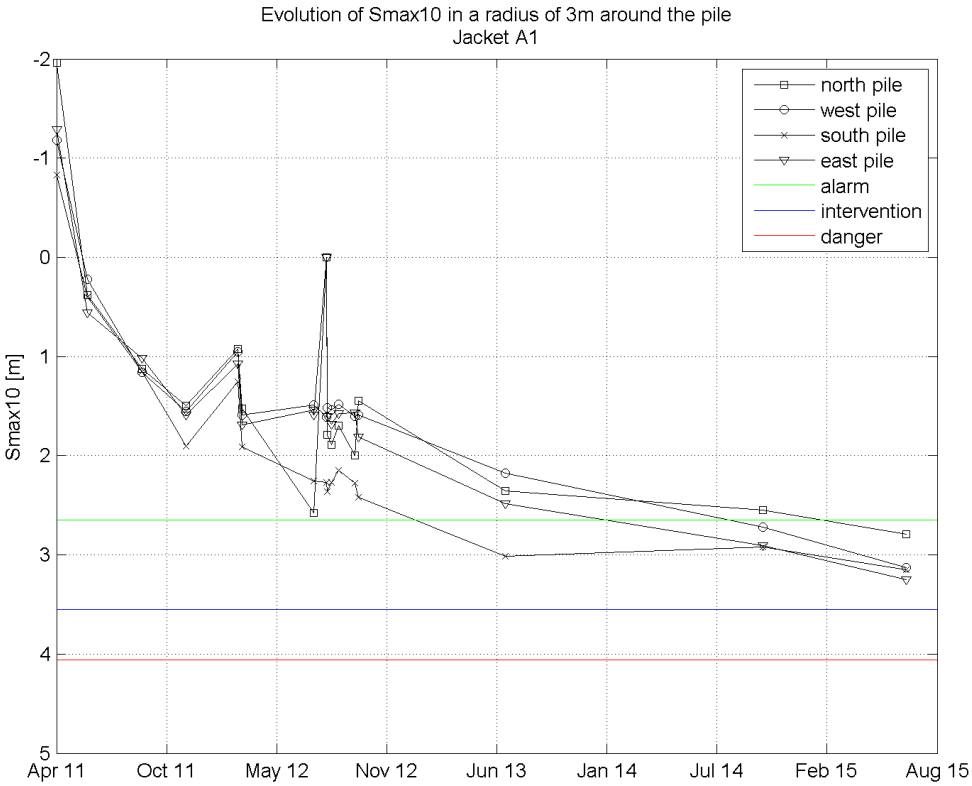
4. RESULTS

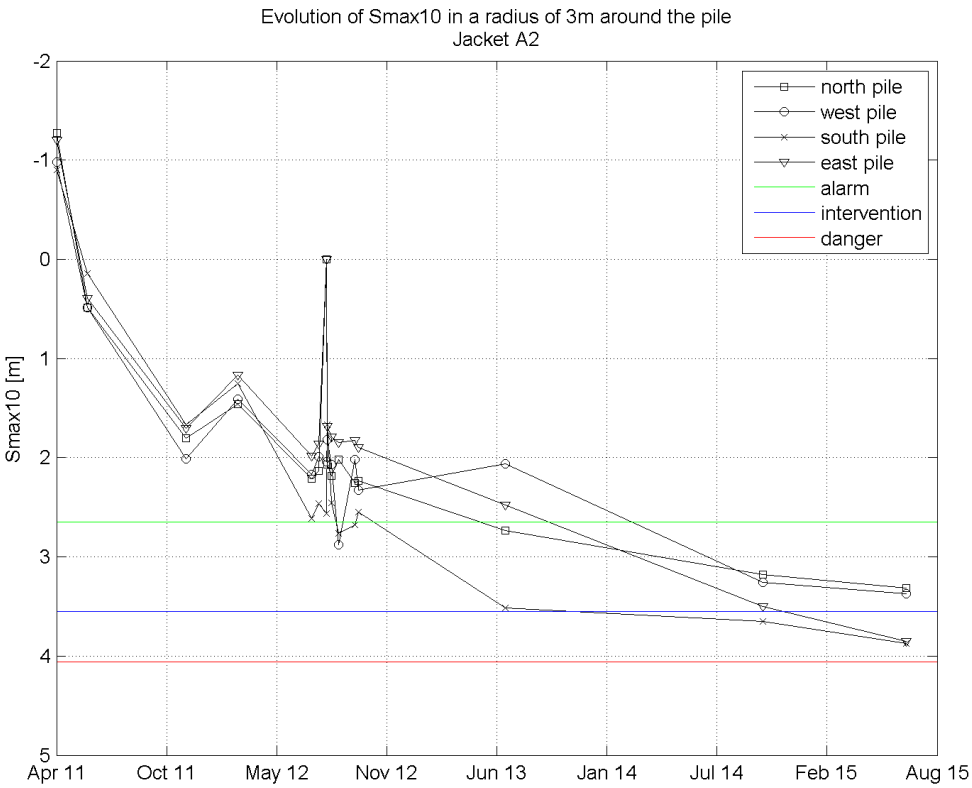
Previously, it has been concluded that the scour depth around the jacket piles in area B reached its equilibrium for all the piles of the different jacket foundations. At some locations (for example E3, E4, F3, H4,...) even slight accretion was observed. Further, it was reported that the equilibrium scour depth decreases with increasing water depth. For jacket foundations installed in area B at depths > -19 m TAW, the reached equilibrium scour depth S_{max10} is in general not larger than 1 m. For jacket foundations with installation depths smaller than -19 m TAW, the equilibrium scour depth S_{max10} can reach up till 2 m in area B. Compared to the previous memo, no new bathymetric data is available for area B.

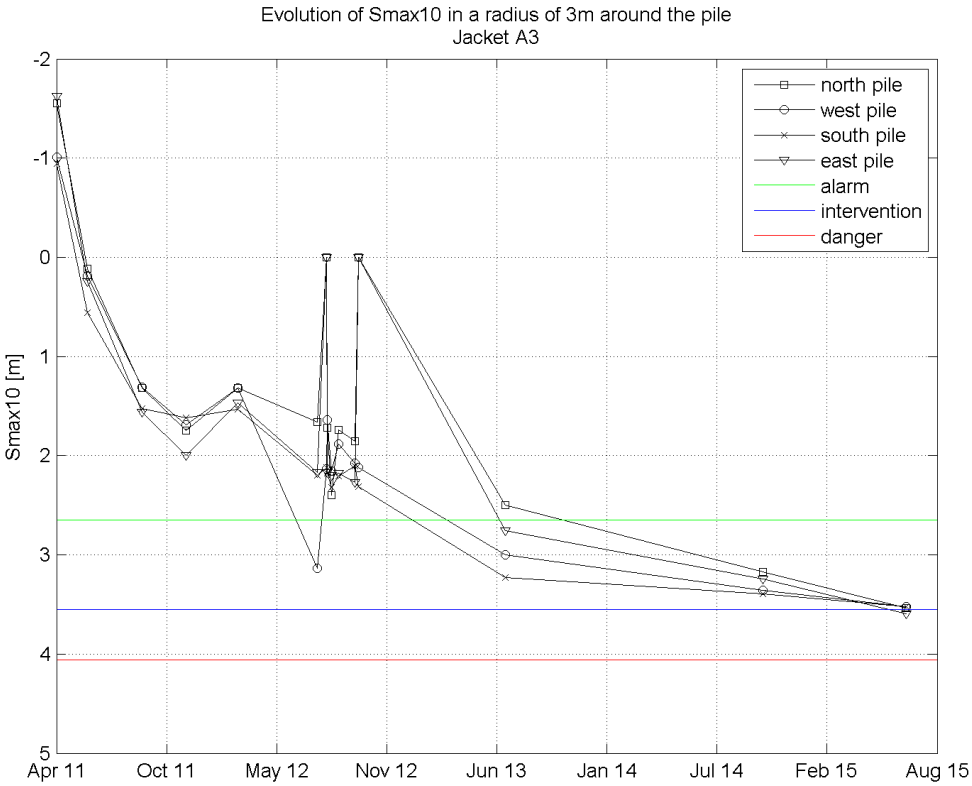
The latest multibeam data show that the equilibrium scour depth has not yet been reached for all the jacket foundations in area A. Scour depth evolution is still observed around all the piles of jackets A1, A2, A3, B1, and D0. For jackets B2, B3 and C1 the scour progress is mainly limited to the eastern pile. These particular jackets are installed at rather shallow locations (PDTDL_ab < -22 m TAW). In general, and similar to the observations made in area B, the scour depth is inversely proportional to the installation depth. For the other turbine jackets, it is assumed that the scour depth has reached its equilibrium.

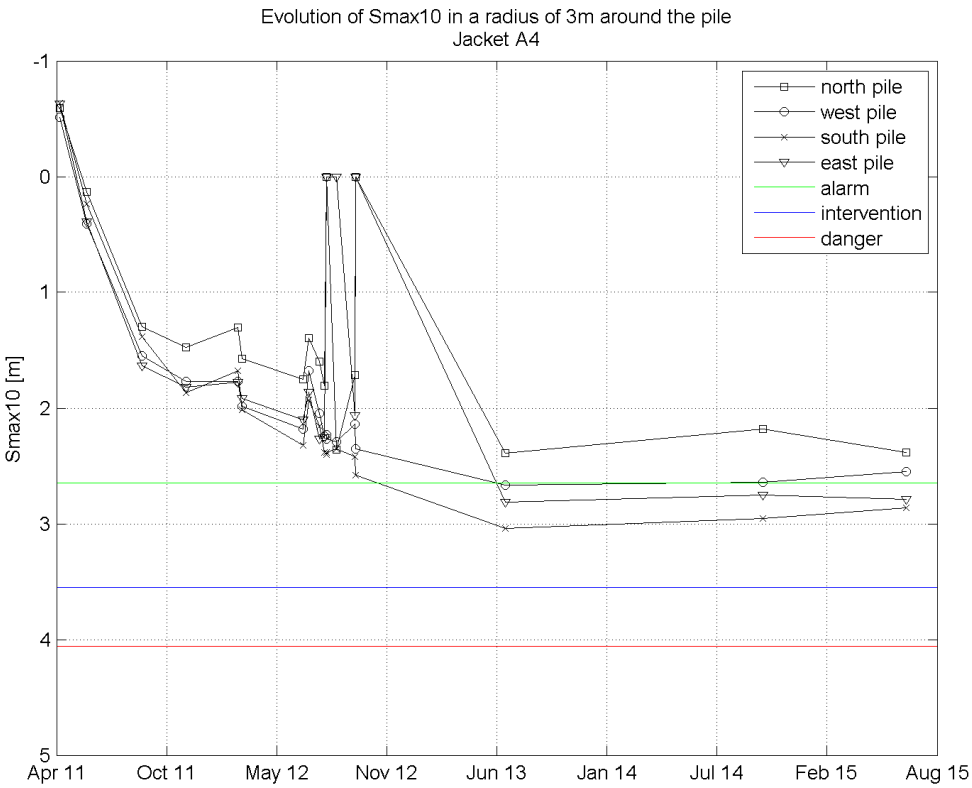
It should be noted that the results of the construction surveys of May and July 2012 are deviating. Probably the measurements of these surveys are influenced by reflections of the multibeam signal on the pile of the jacket itself. None of the other surveys show these deviations.

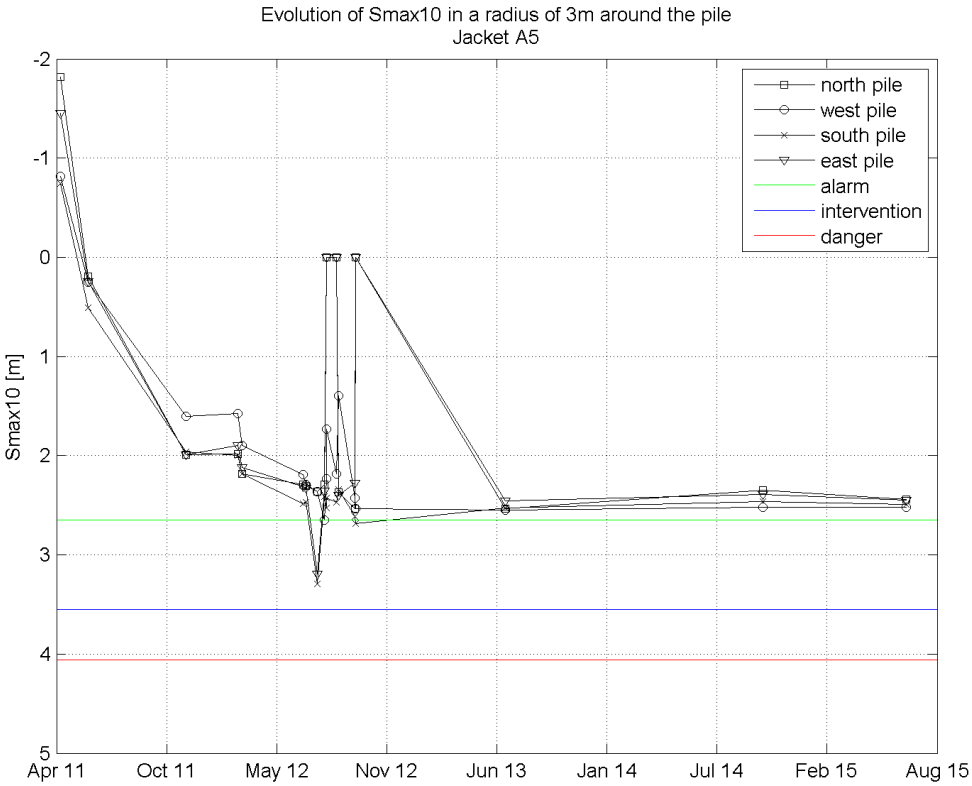
Annex A Plots evolution scour depth

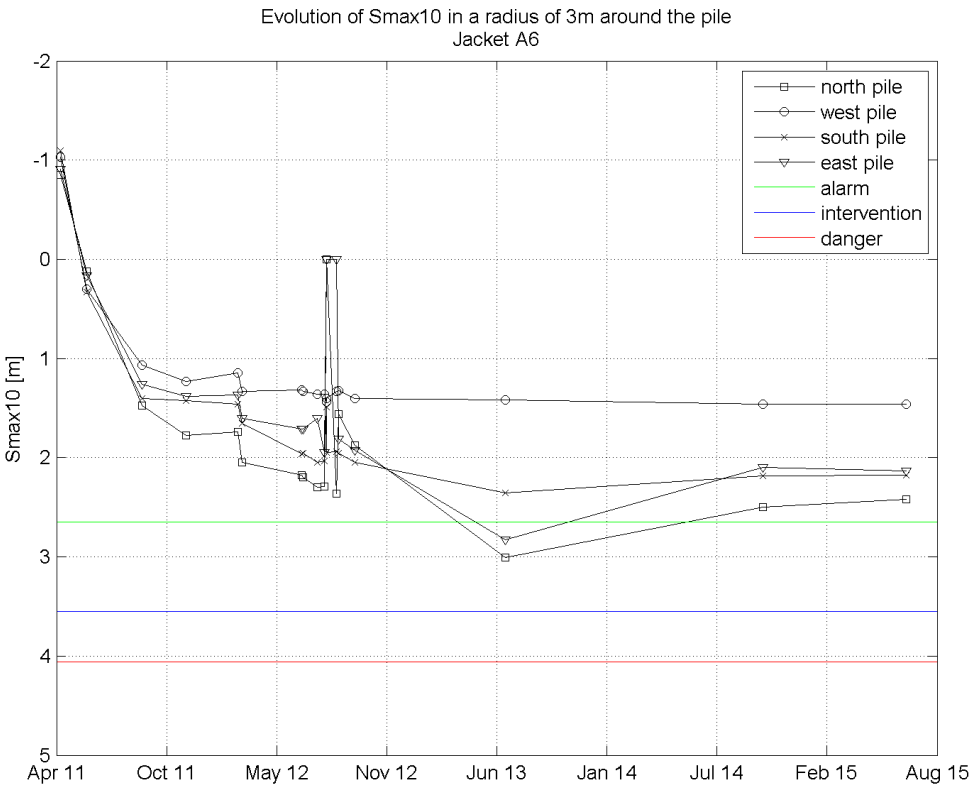

Evolution of Smax10 in a radius of 3m around the pile
Jacket A1
Smax10 [m]
-2
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

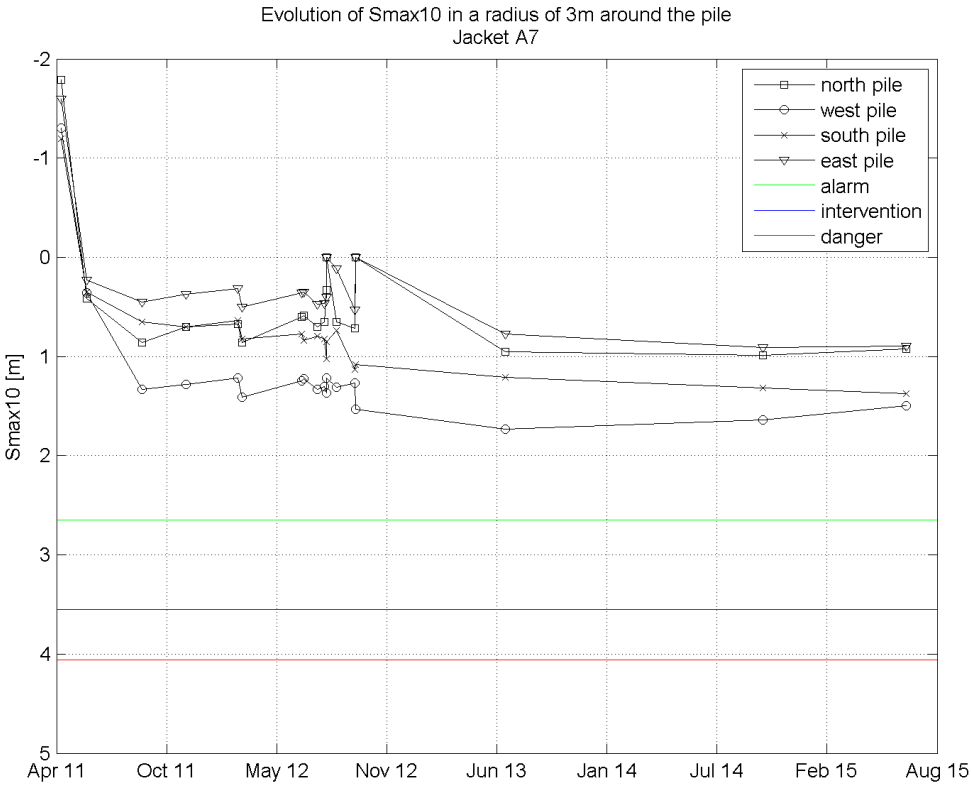

Evolution of Smax10 in a radius of 3m around the pile
Jacket A2
Smax10 [m]
-2
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

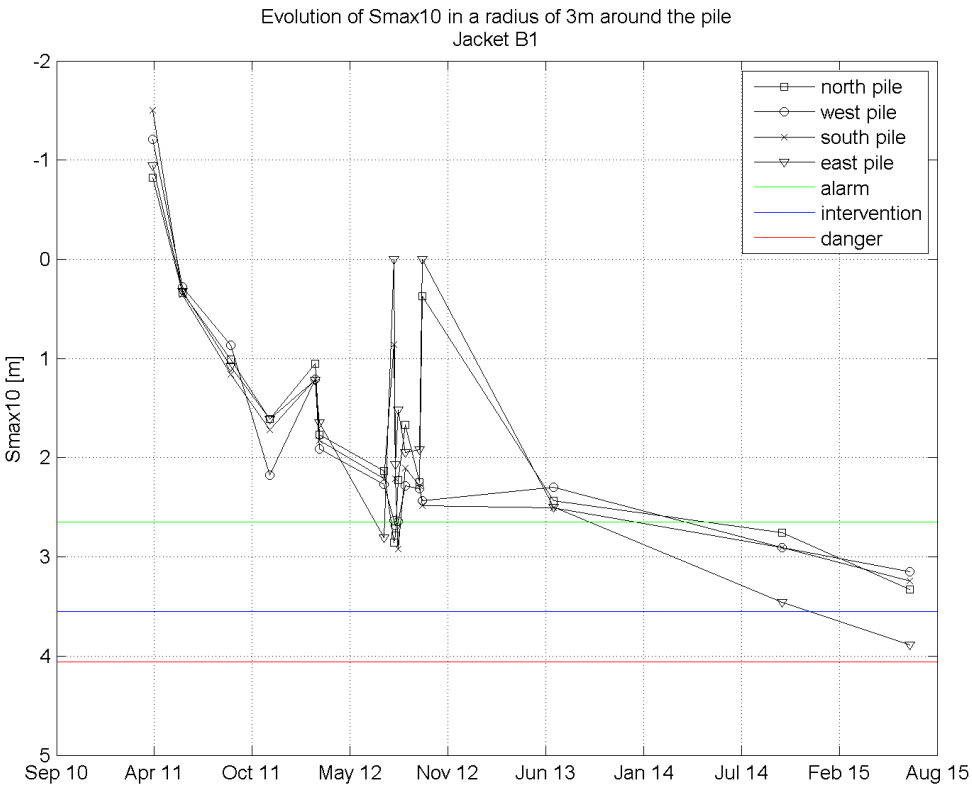

Evolution of Smax10 in a radius of 3m around the pile
Jacket A3
Smax10 [m]
-2
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

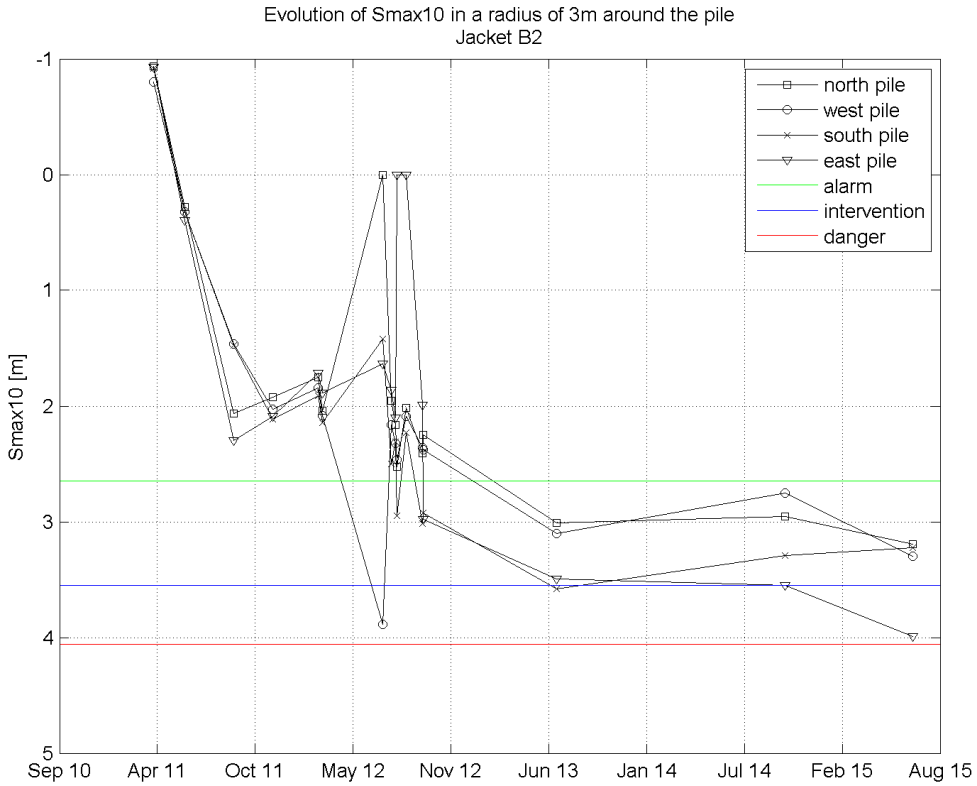

Evolution of Smax10 in a radius of 3m around the pile
Jacket A4
Smax10 [m]
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

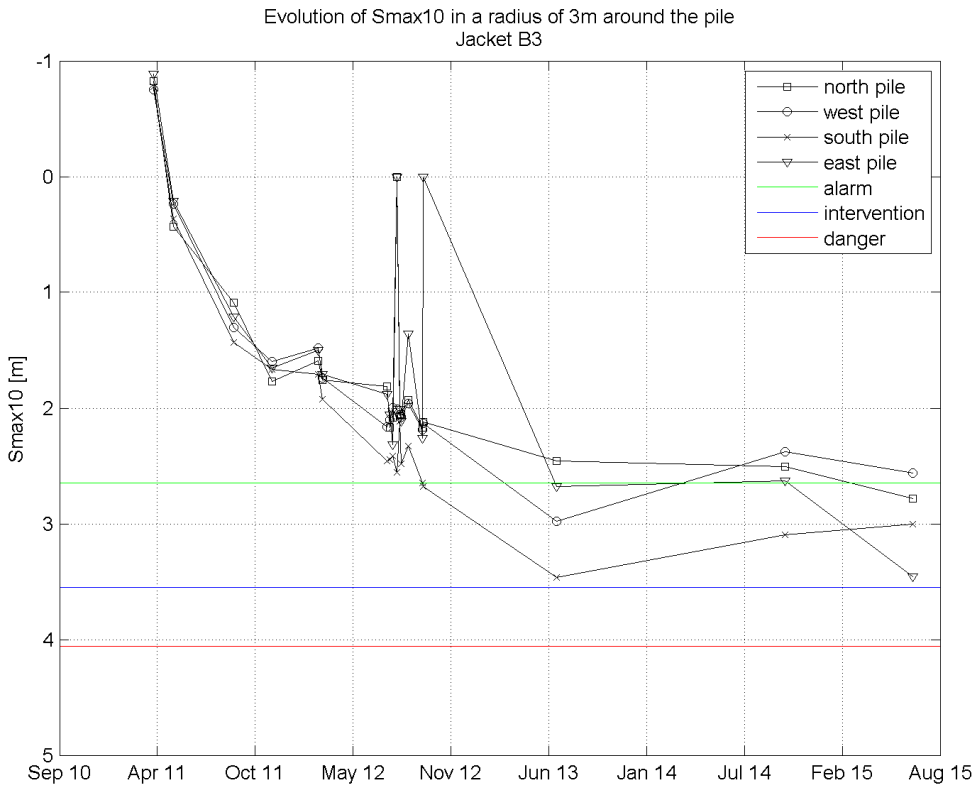

Evolution of Smax10 in a radius of 3m around the pile
Jacket A5
Smax10 [m]
-2
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

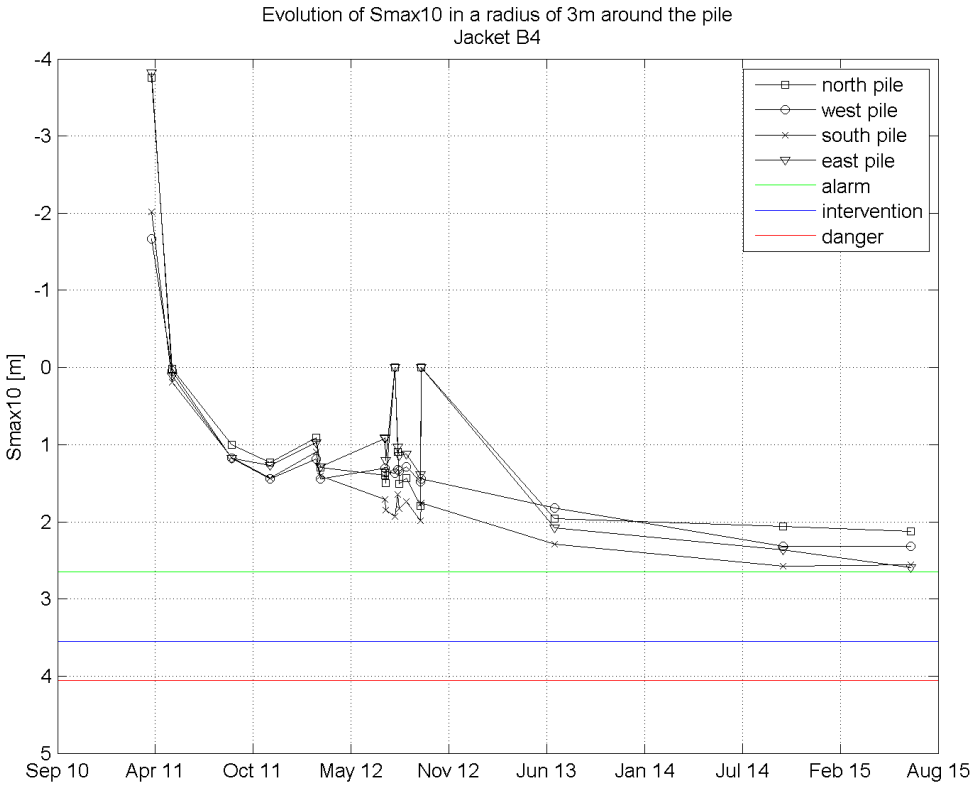

Evolution of Smax10 in a radius of 3m around the pile
Jacket A6
Smax10 [m]
-2
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

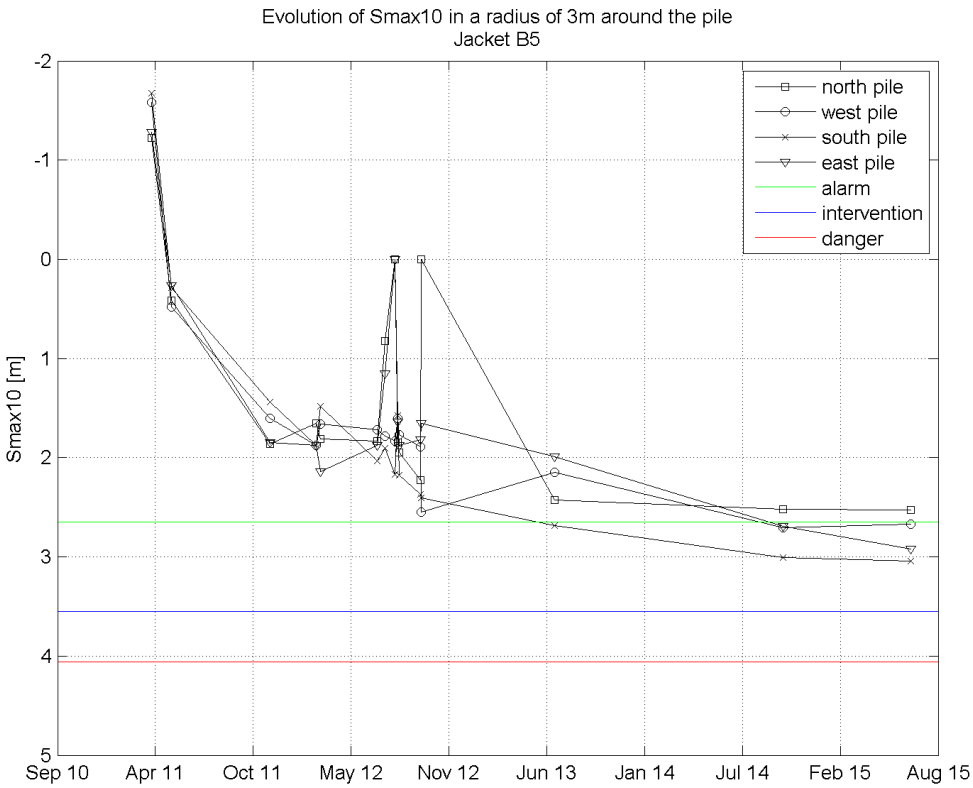

Evolution of Smax10 in a radius of 3m around the pile
Jacket A7
Smax10 [m]
-2
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket B1
Smax10 [m]
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket B2
Smax10 [m]
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket B3
Smax10 [m]
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket B4
Smax10 [m]
-4
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket B5
Smax10 [m]
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
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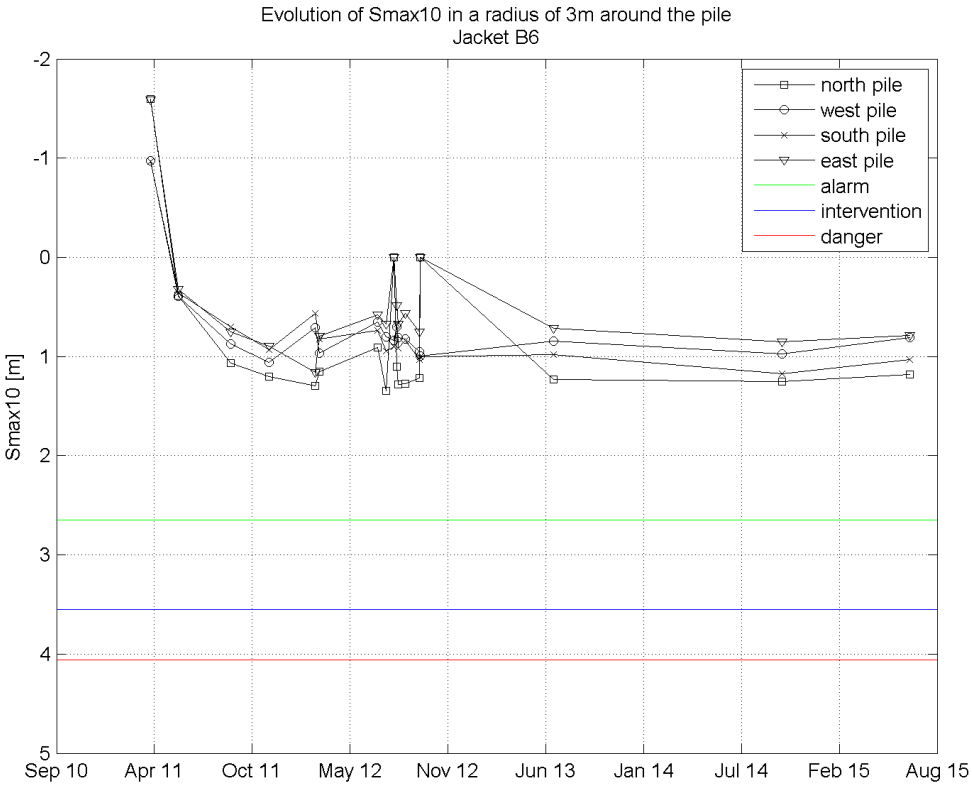
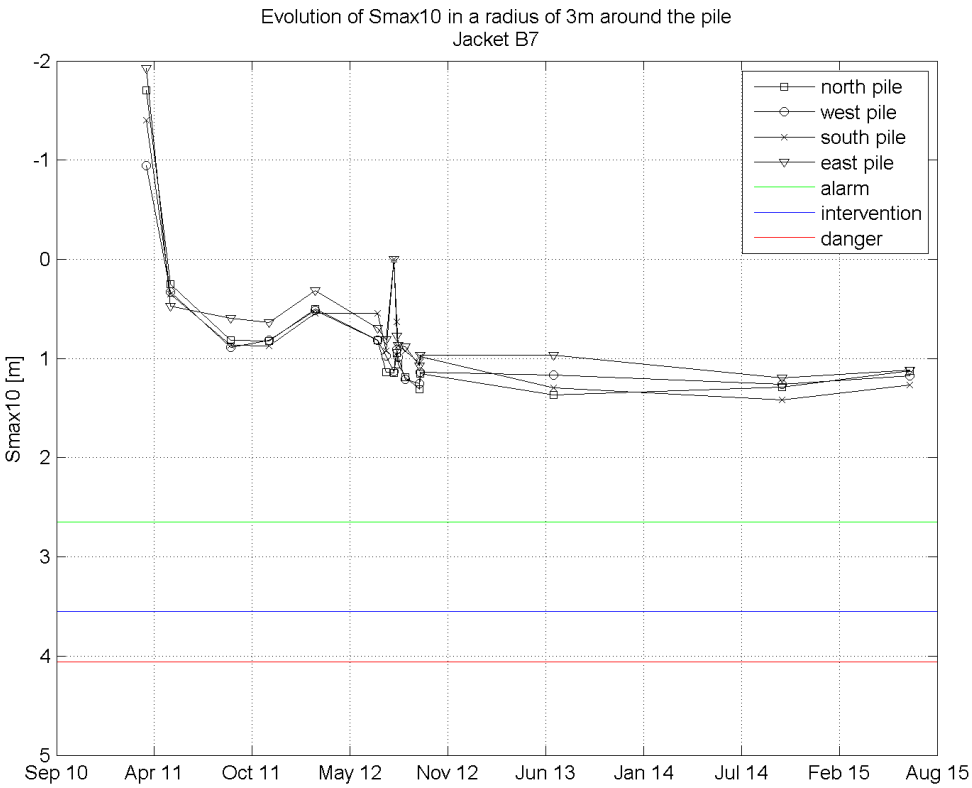
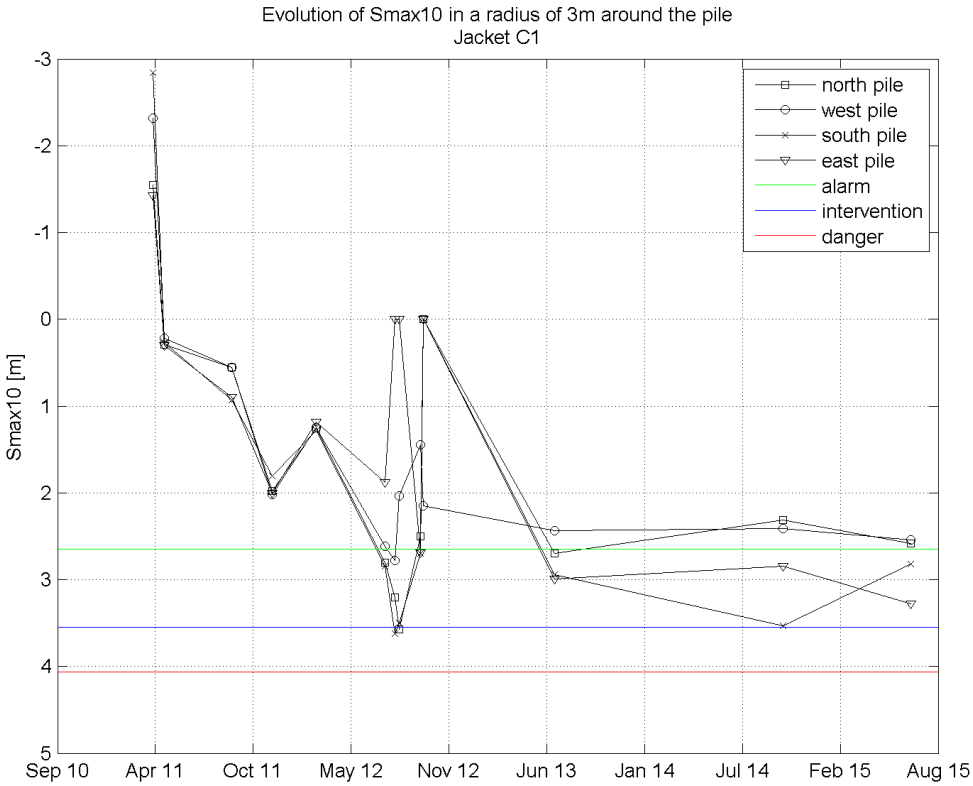
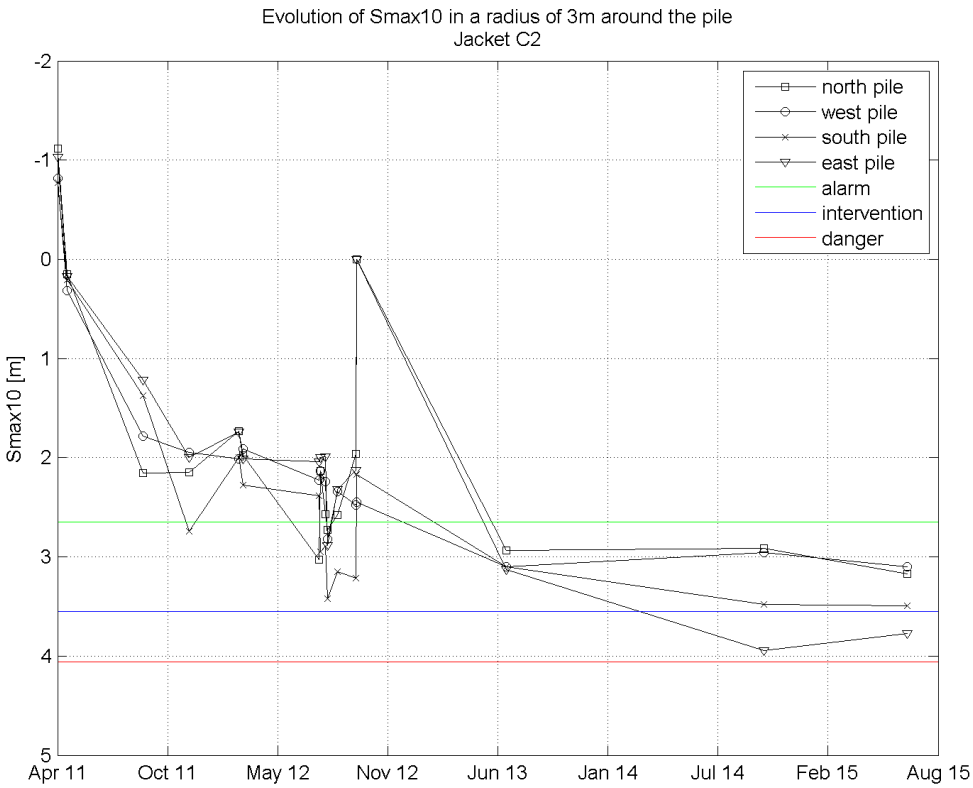
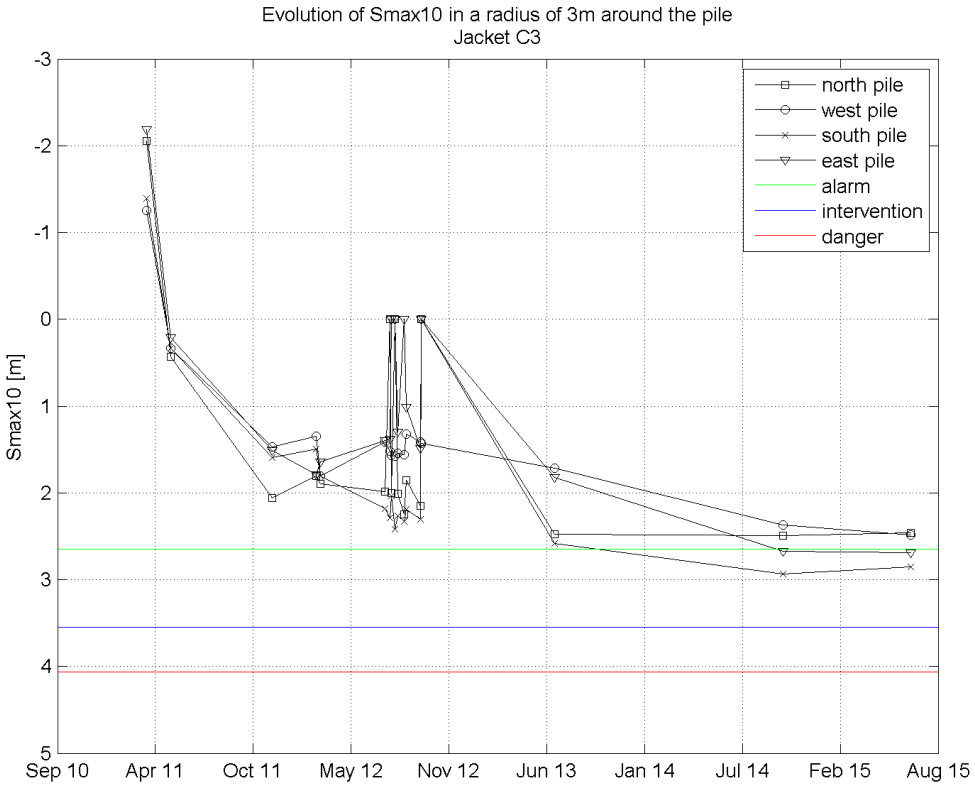
alarm
intervention
danger

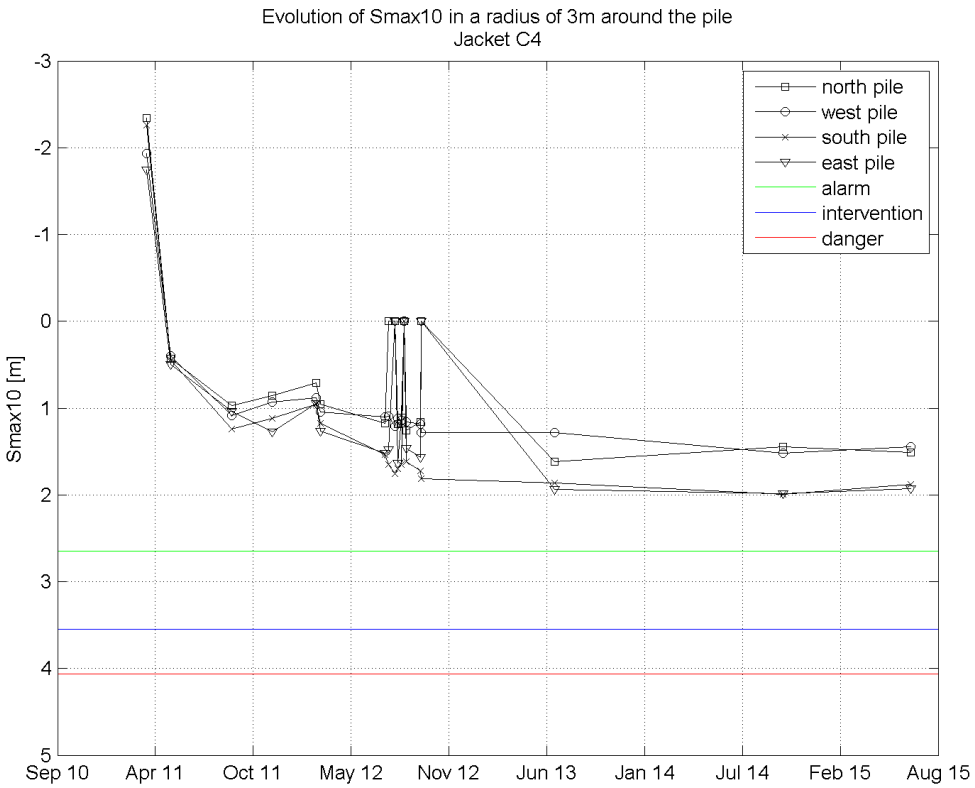

Evolution of Smax10 in a radius of 3m around the pile
Jacket B6
Smax10 [m]
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

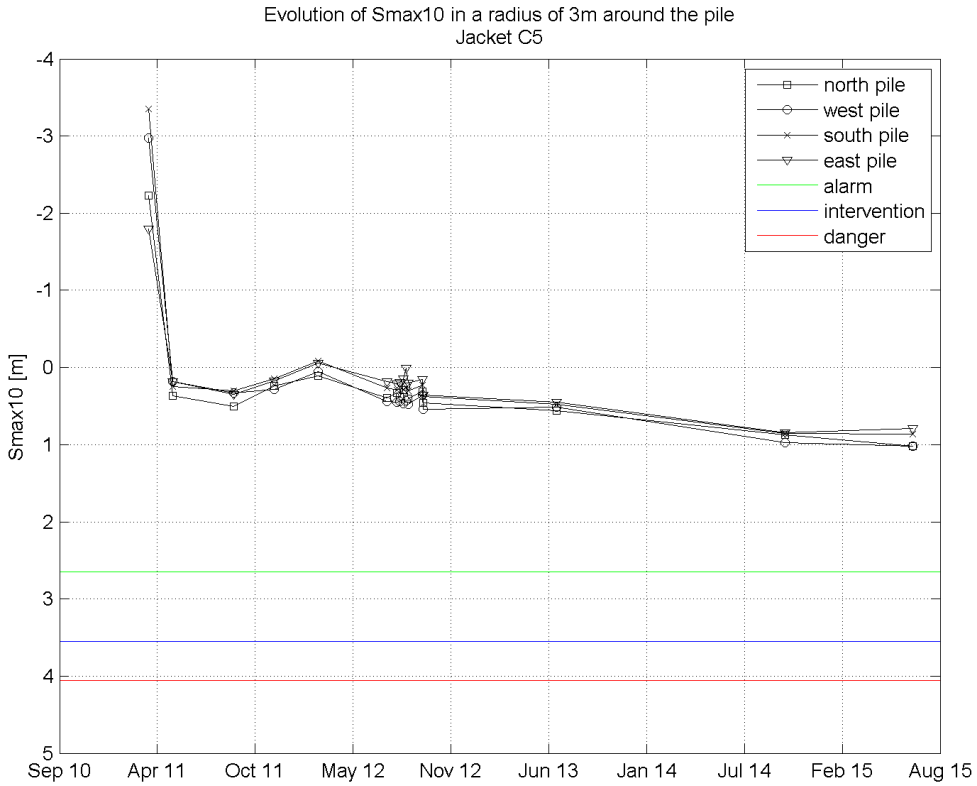

Evolution of Smax10 in a radius of 3m around the pile
Jacket B7
Smax10 [m]
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

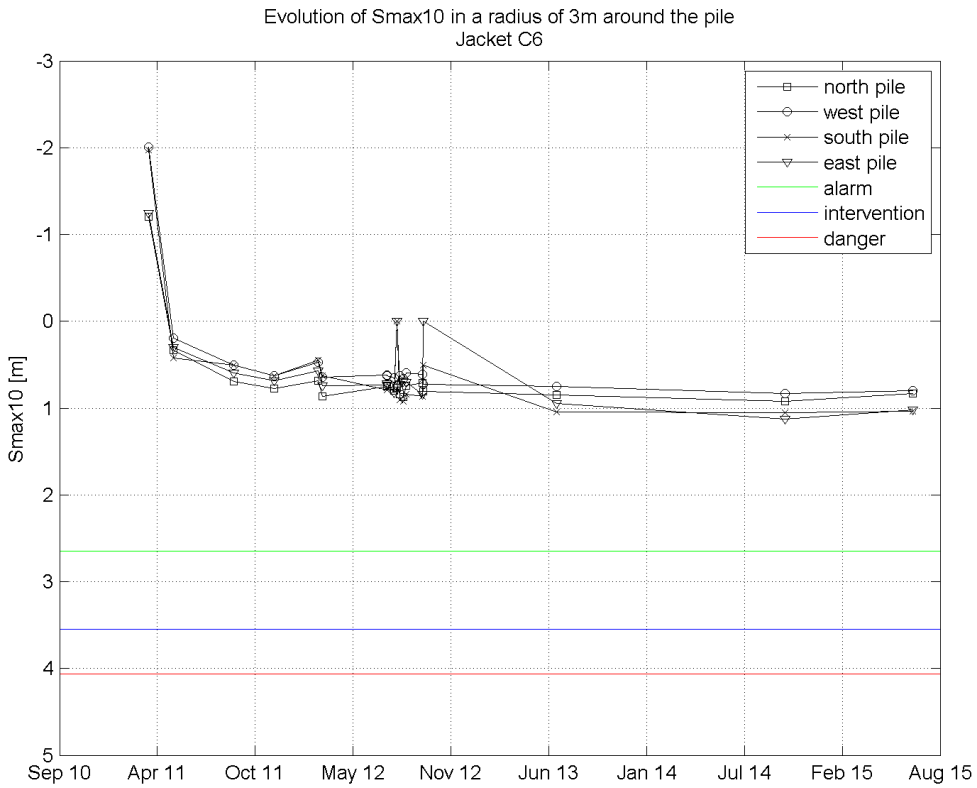

Evolution of Smax10 in a radius of 3m around the pile
Jacket C1
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

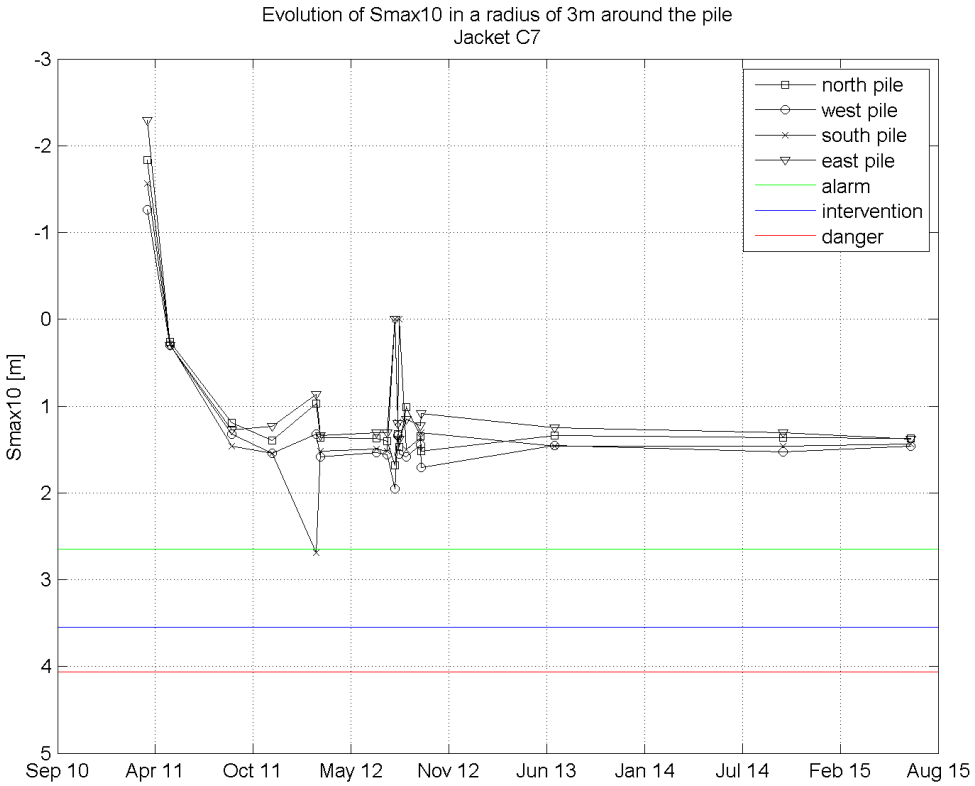

Evolution of Smax10 in a radius of 3m around the pile
Jacket C2
Smax10 [m]
-2
-1
0
1
2
3
4
5
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

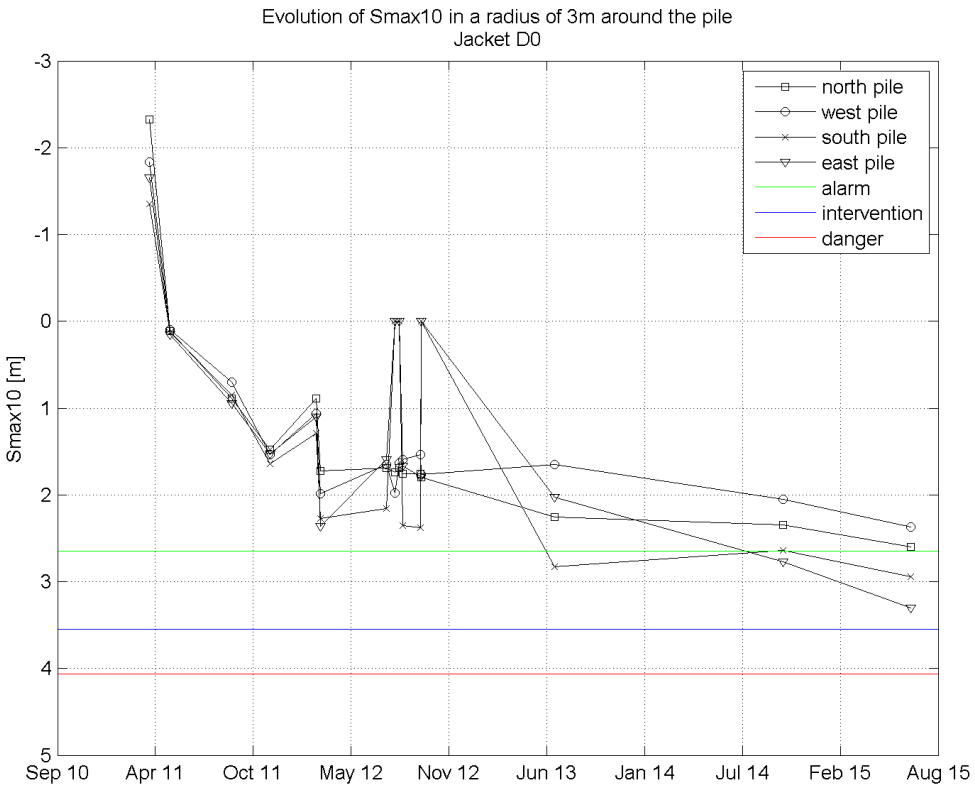

Evolution of Smax10 in a radius of 3m around the pile
Jacket C3
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

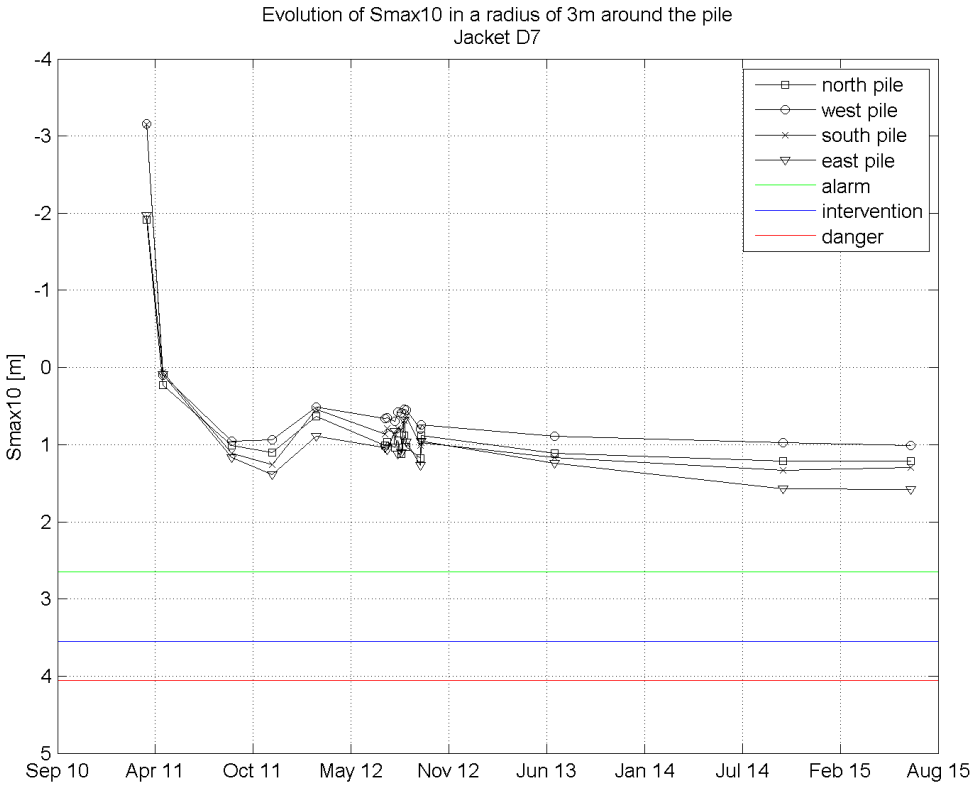

Evolution of Smax10 in a radius of 3m around the pile
Jacket C4
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

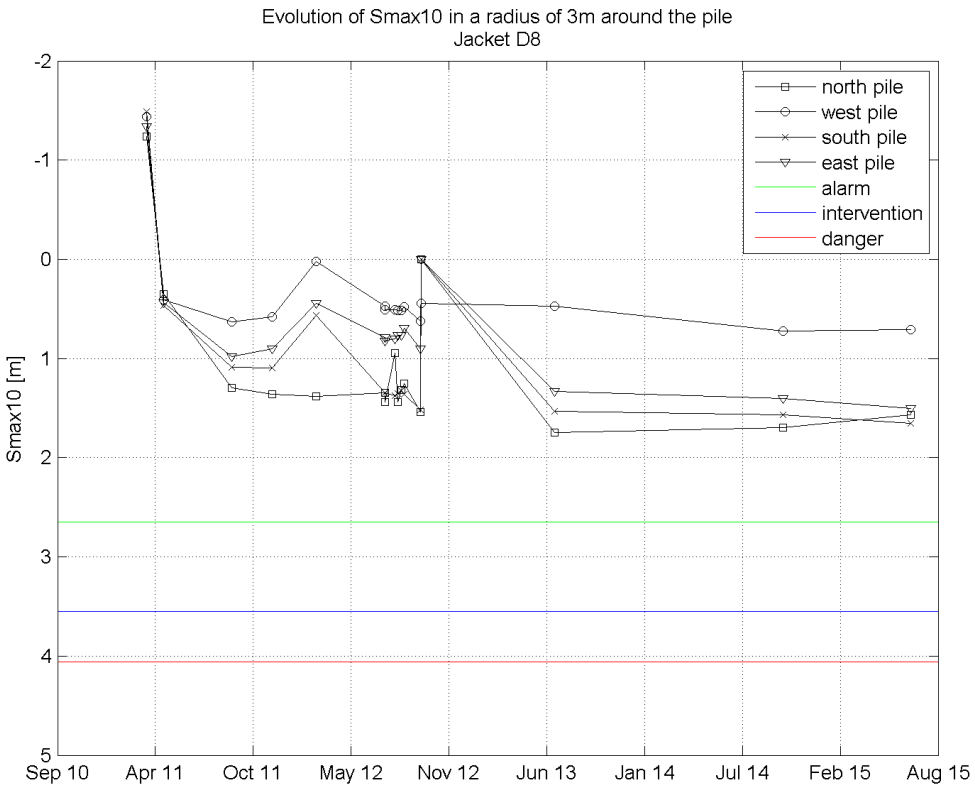

Evolution of Smax10 in a radius of 3m around the pile
Jacket C5
Smax10 [m]
-4
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

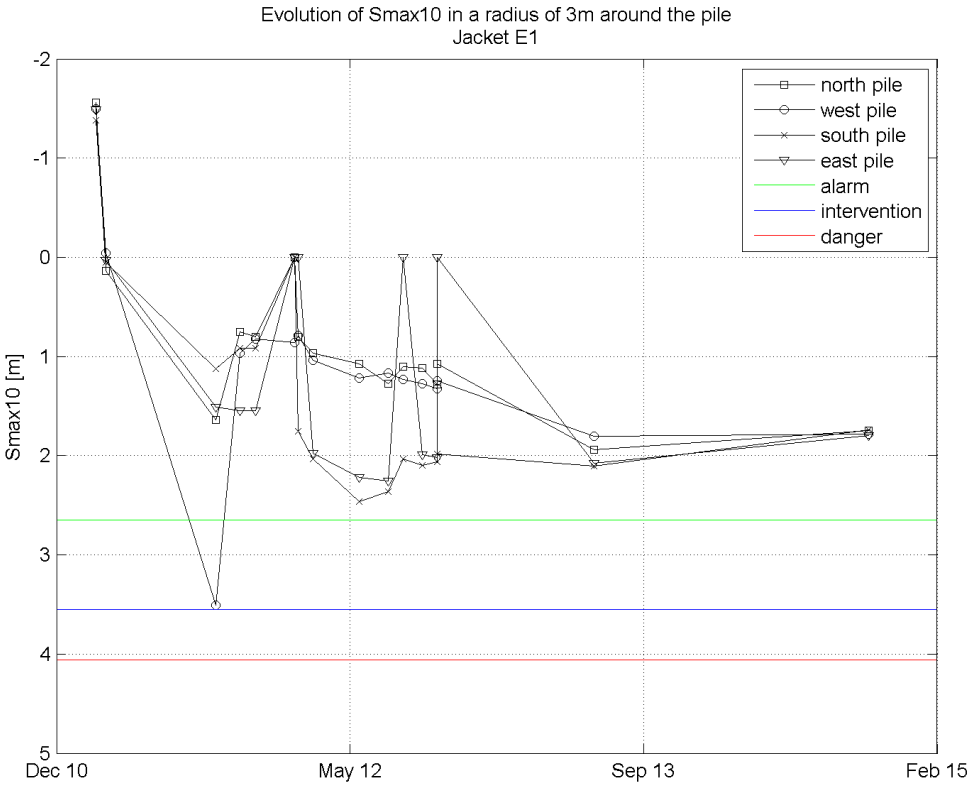

Evolution of Smax10 in a radius of 3m around the pile
Jacket C6
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

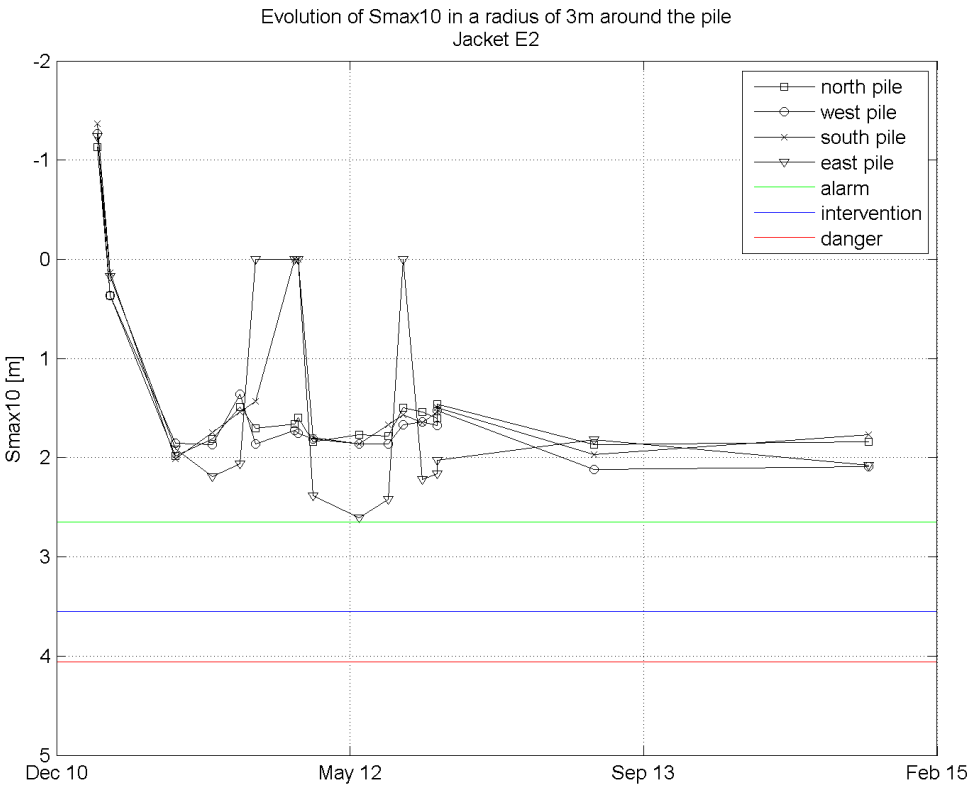

Evolution of Smax10 in a radius of 3m around the pile
Jacket C7
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

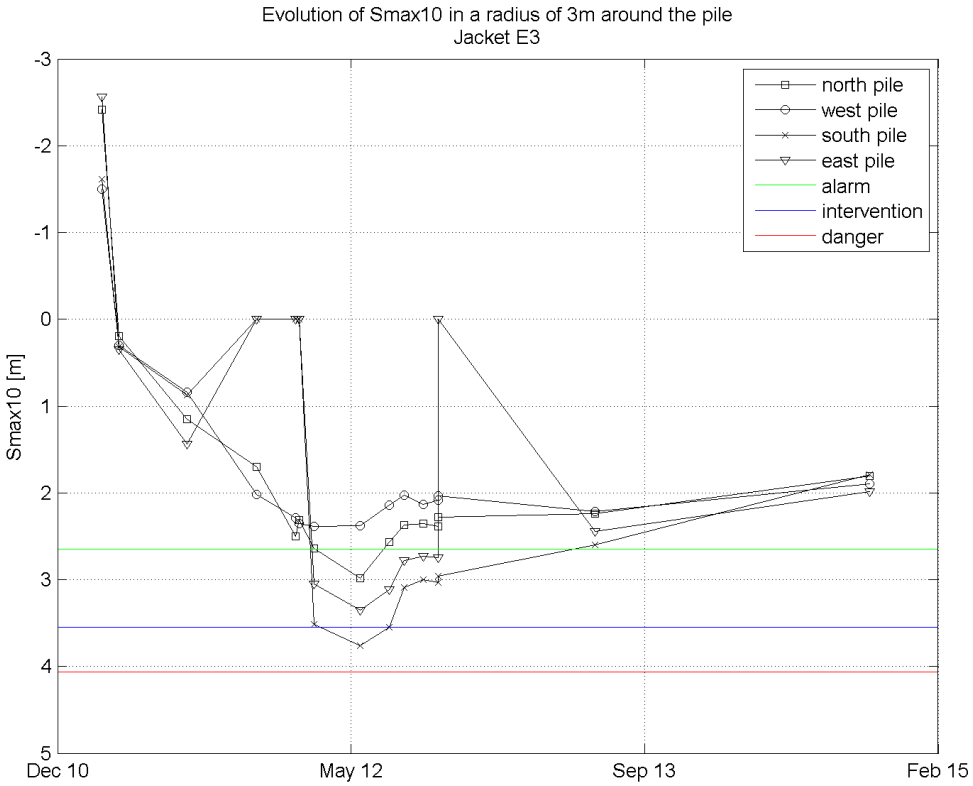

Evolution of Smax10 in a radius of 3m around the pile
Jacket D0
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

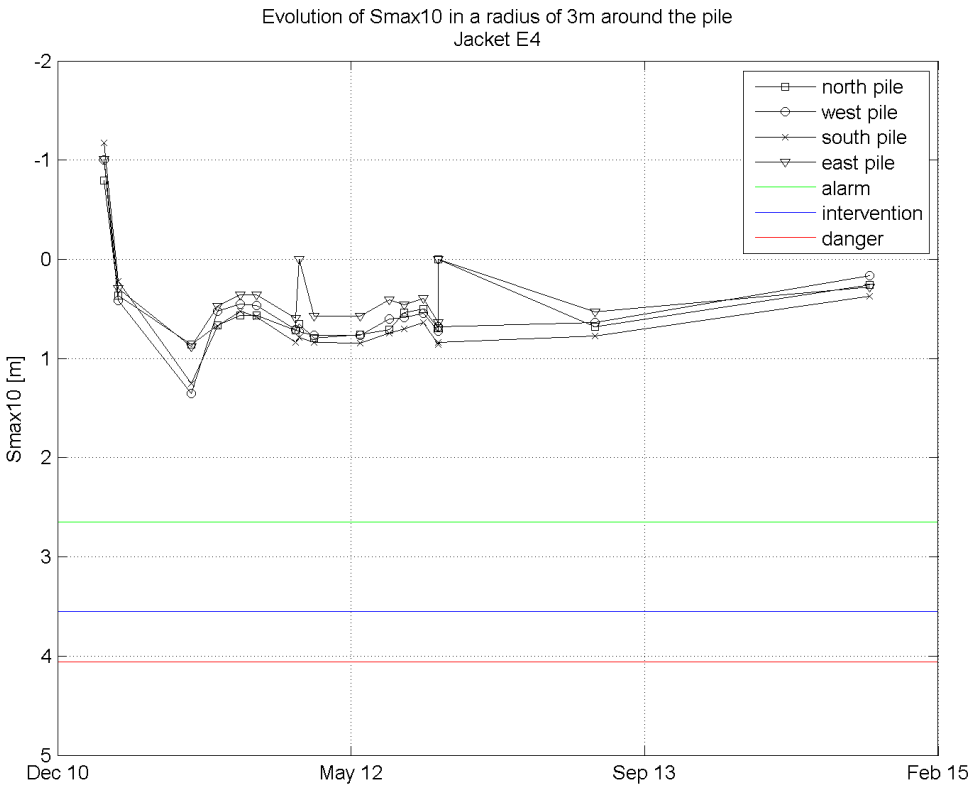

Evolution of Smax10 in a radius of 3m around the pile
Jacket D7
Smax10 [m]
-4
-3
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

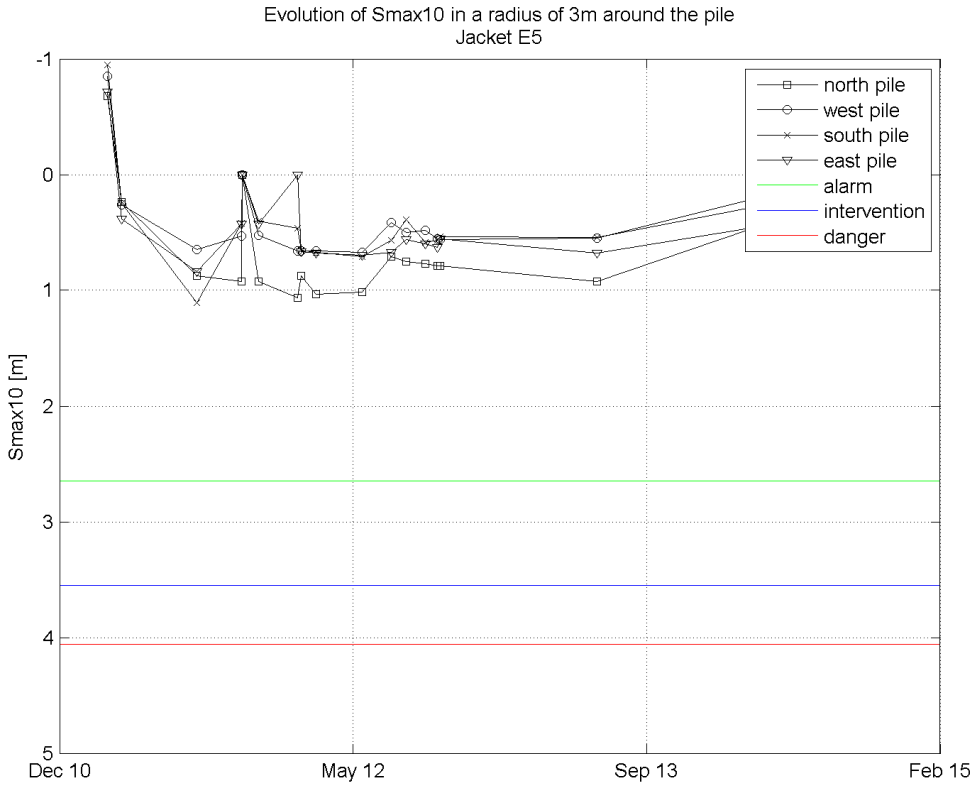

Evolution of Smax10 in a radius of 3m around the pile
Jacket D8
Smax10 [m]
-2
-1
0
1
2
3
4
5
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
Aug 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

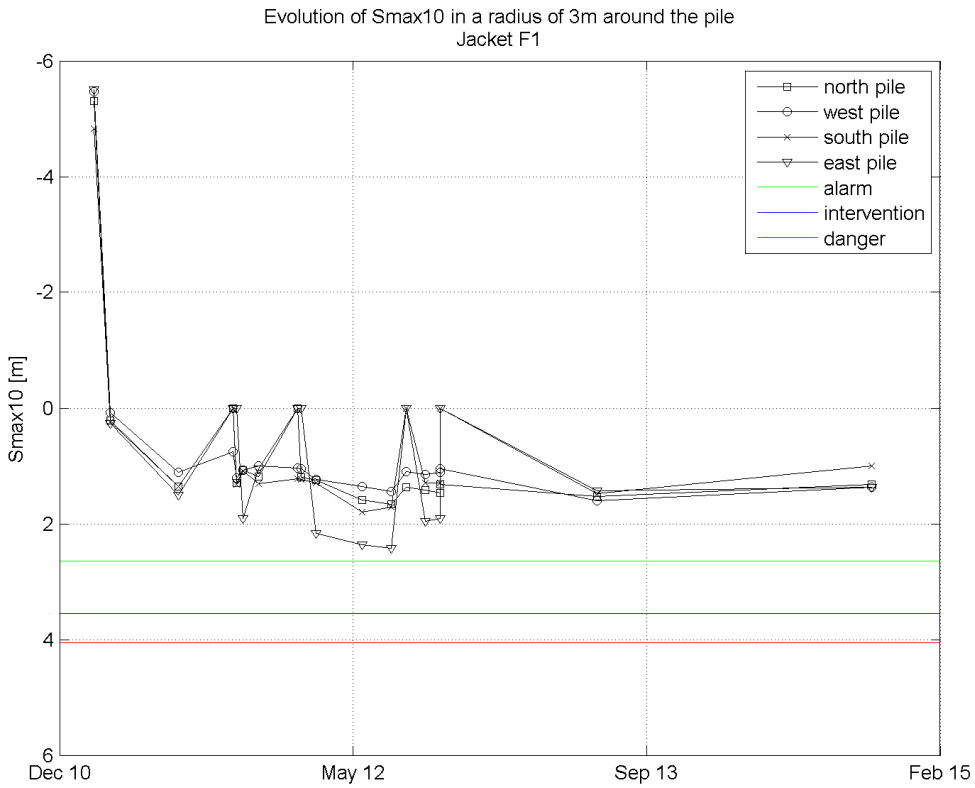

Evolution of Smax10 in a radius of 3m around the pile
Jacket E1
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

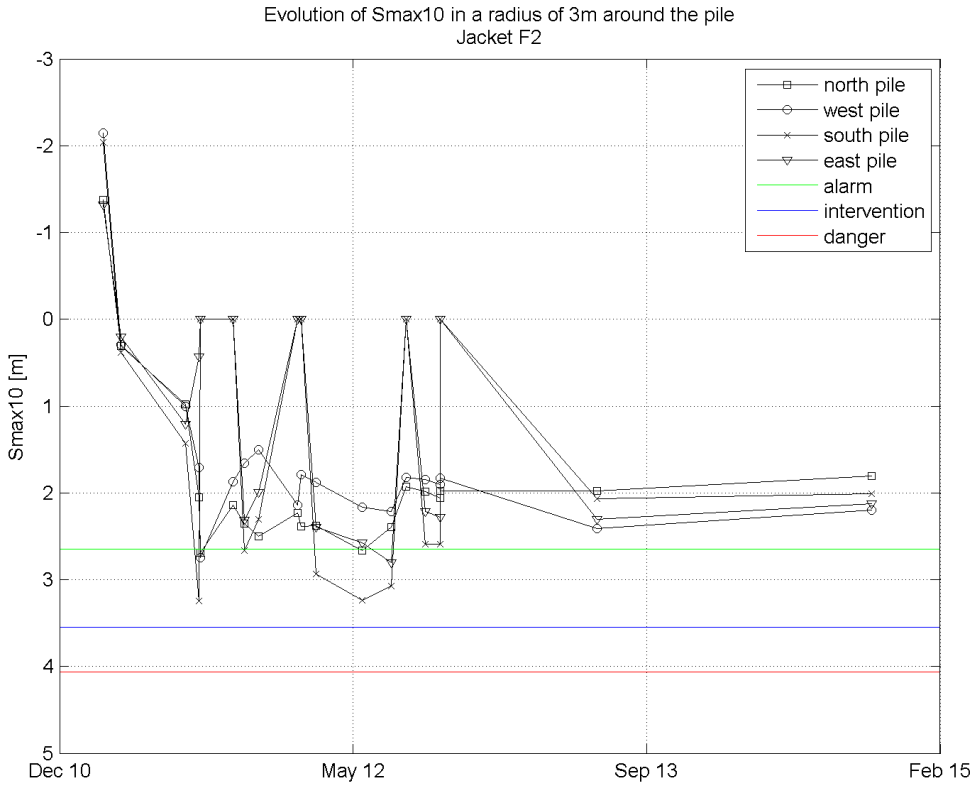

Evolution of Smax10 in a radius of 3m around the pile
Jacket E2
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

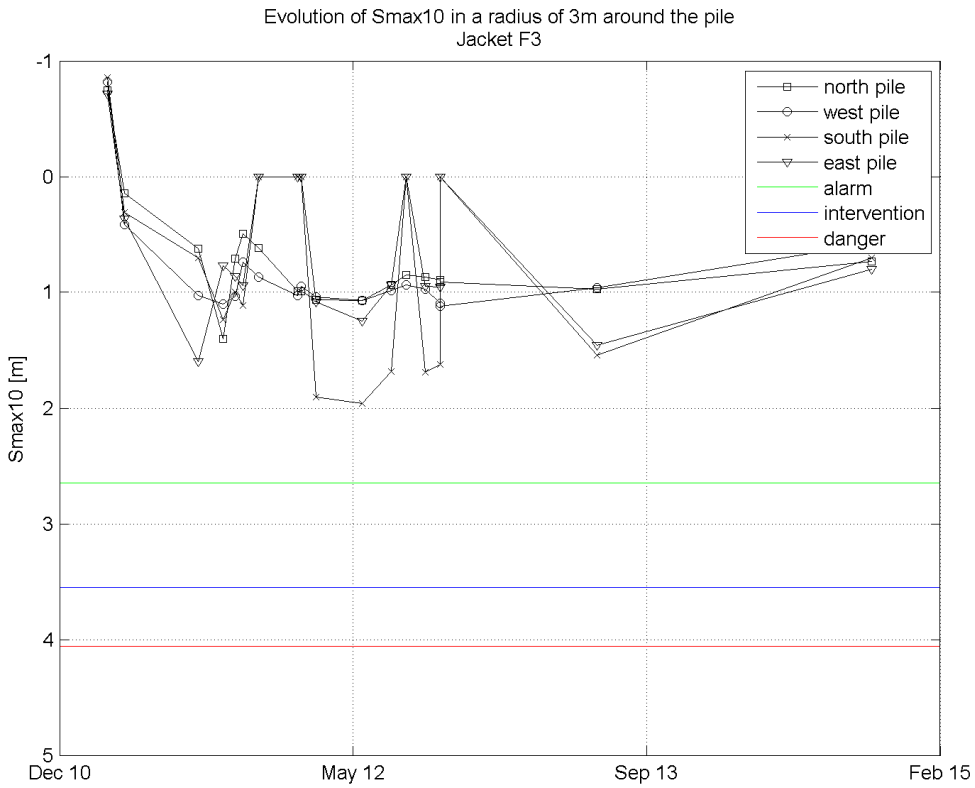

Evolution of Smax10 in a radius of 3m around the pile
Jacket E3
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

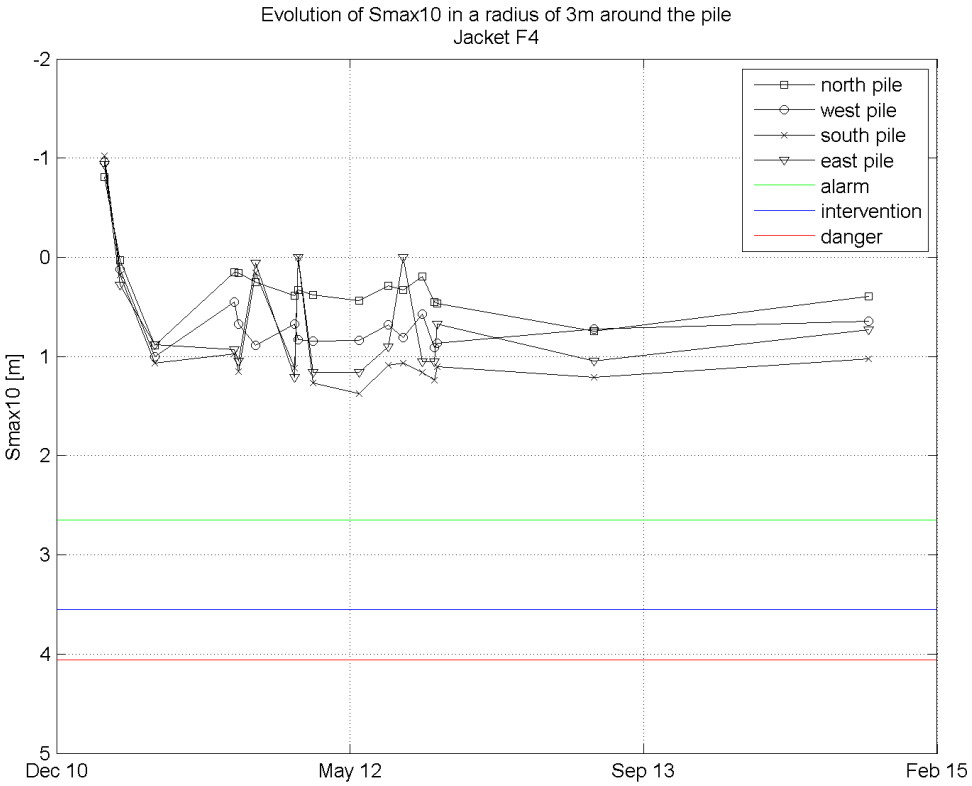

Evolution of Smax10 in a radius of 3m around the pile
Jacket E4
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

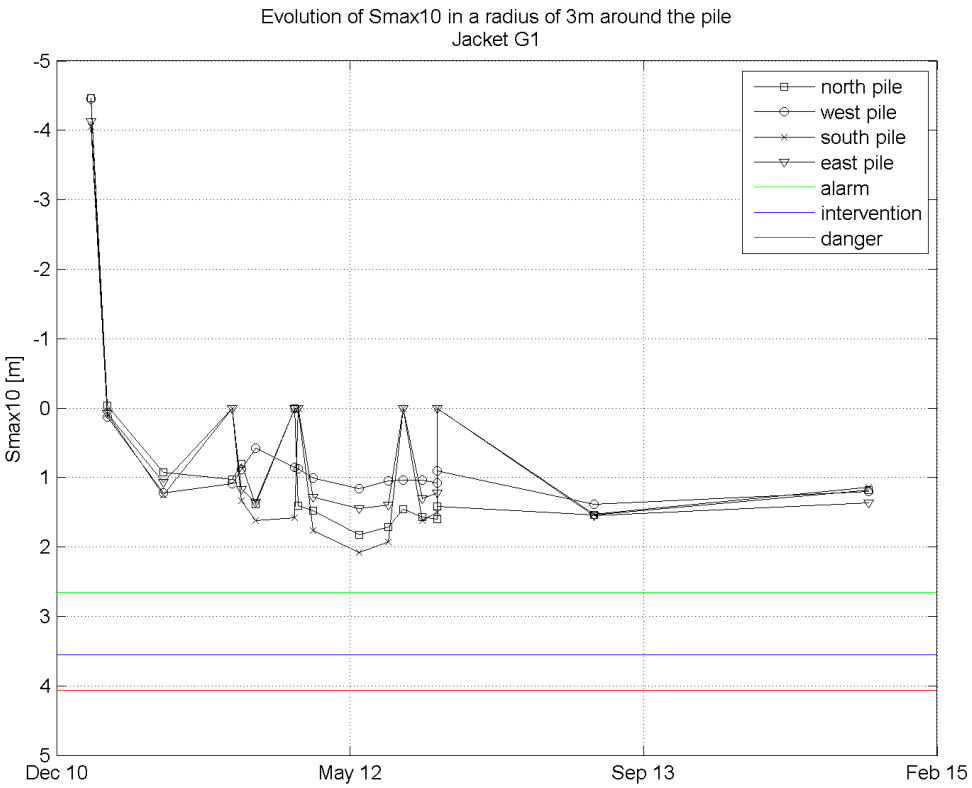

Evolution of Smax10 in a radius of 3m around the pile
Jacket E5
Smax10 [m]
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

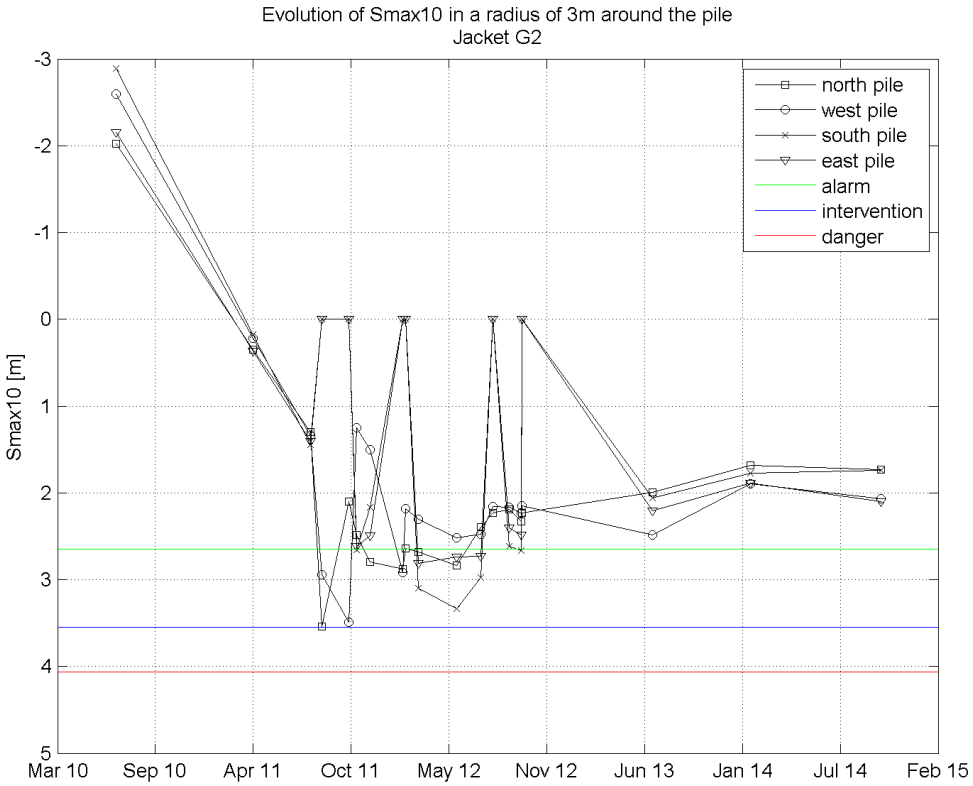

Evolution of Smax10 in a radius of 3m around the pile
Jacket F1
Smax10 [m]
-6
-4
-2
0
2
4
6
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

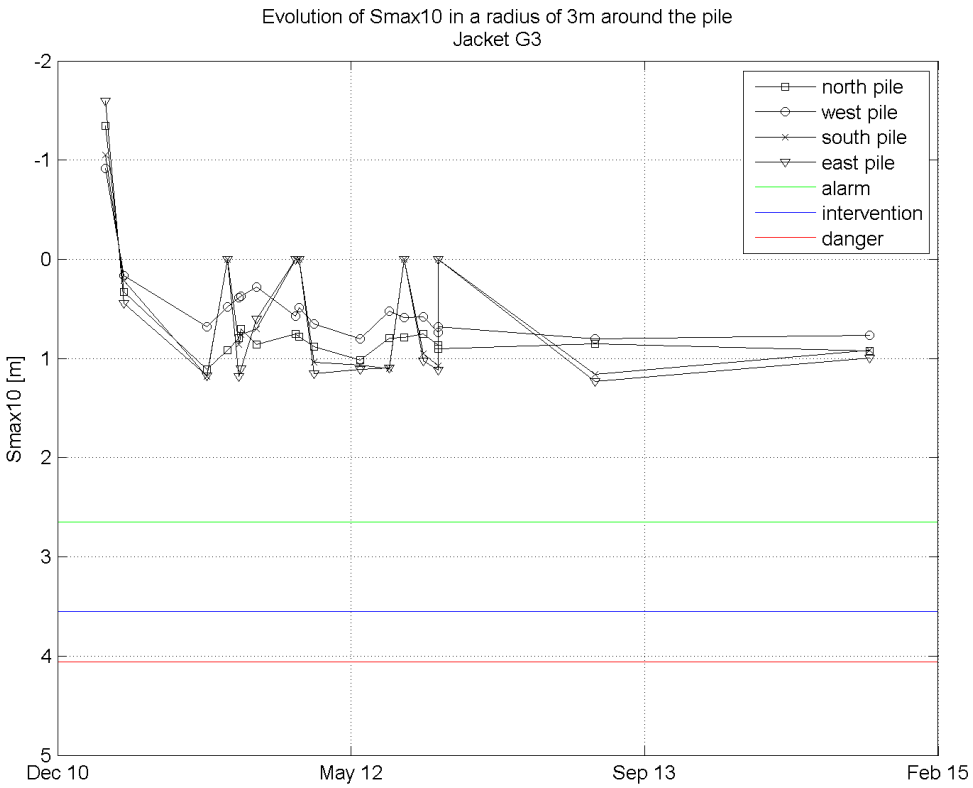

Evolution of Smax10 in a radius of 3m around the pile
Jacket F2
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

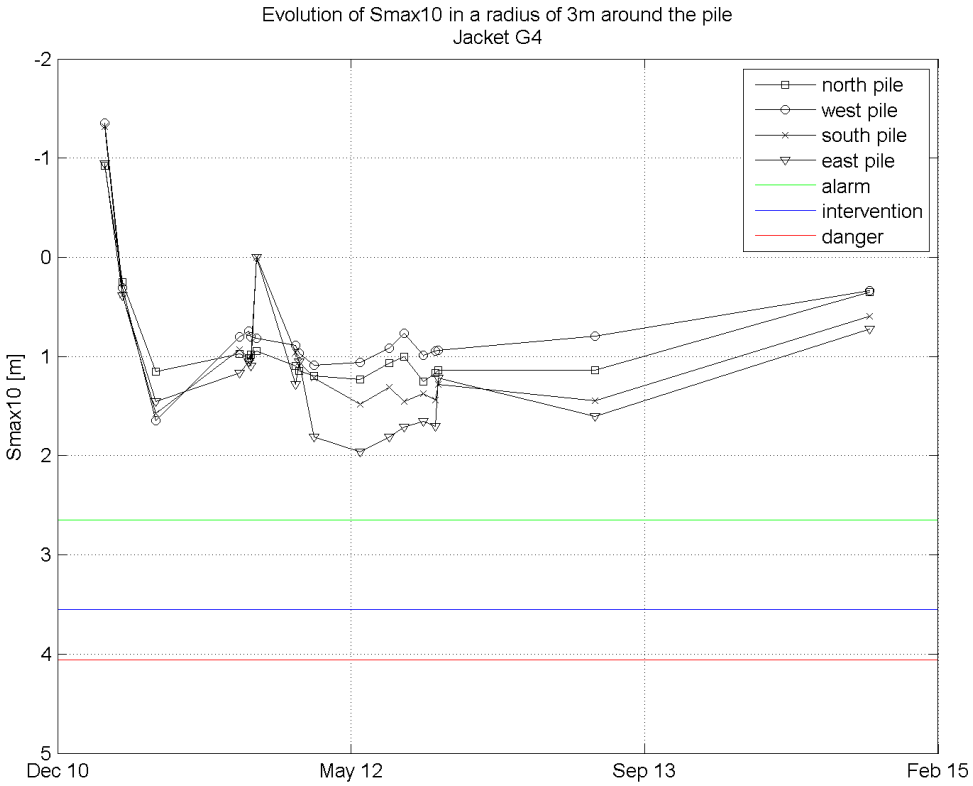

Evolution of Smax10 in a radius of 3m around the pile
Jacket F3
Smax10 [m]
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

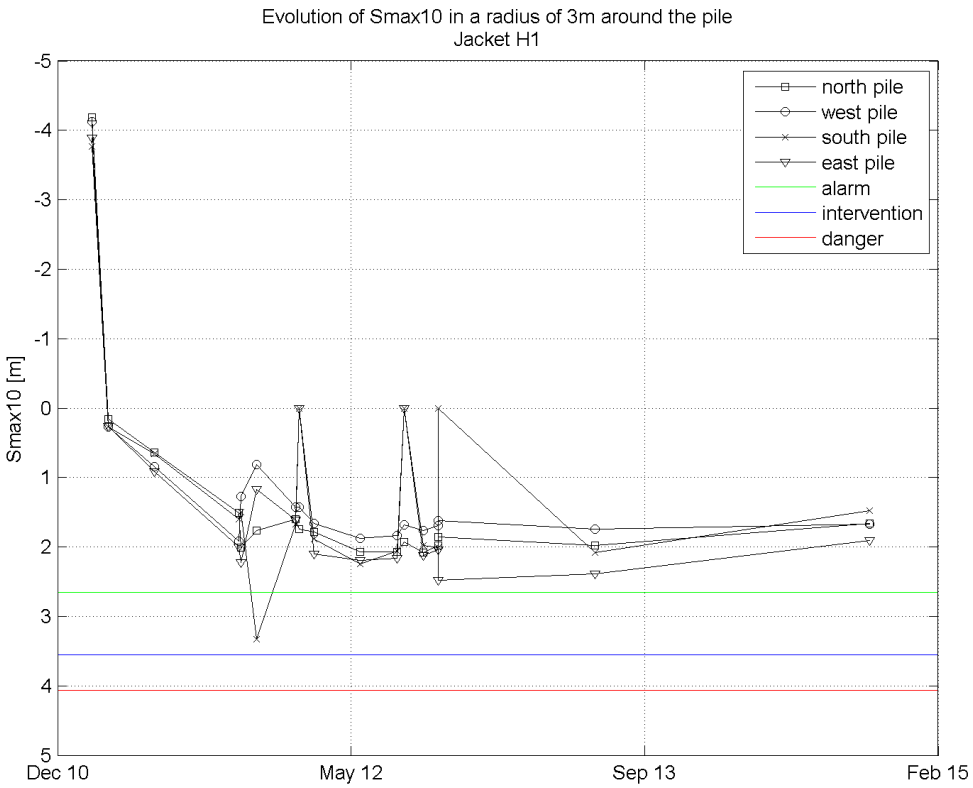

Evolution of Smax10 in a radius of 3m around the pile
Jacket F4
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

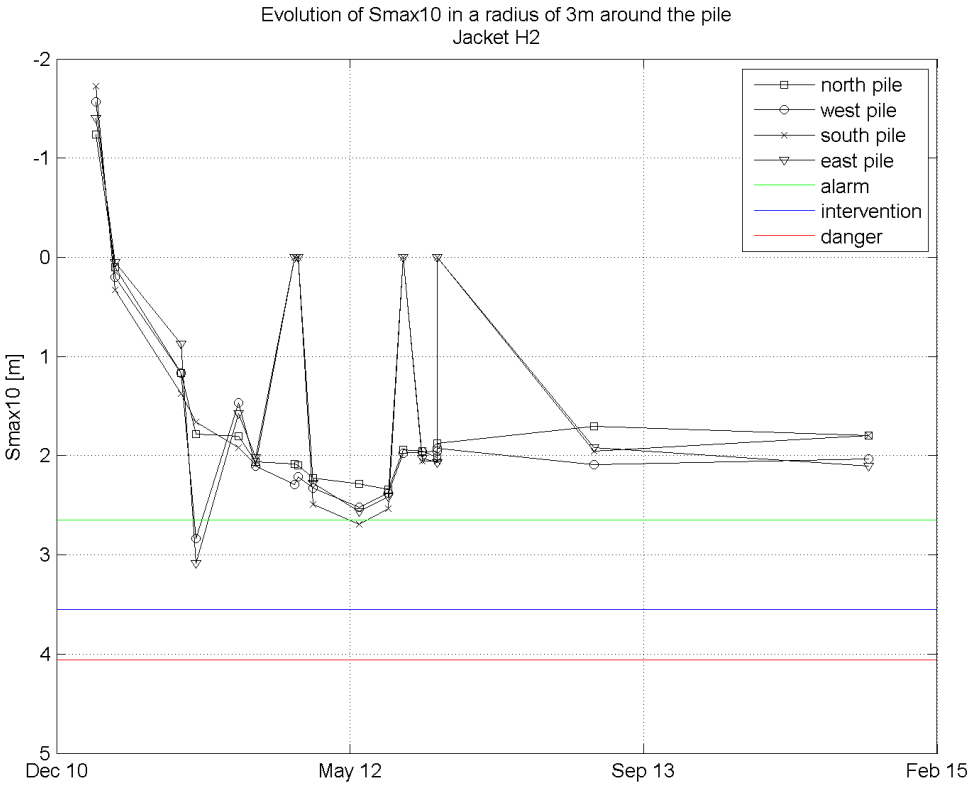

Evolution of Smax10 in a radius of 3m around the pile
Jacket G1
Smax10 [m]
-5
-4
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

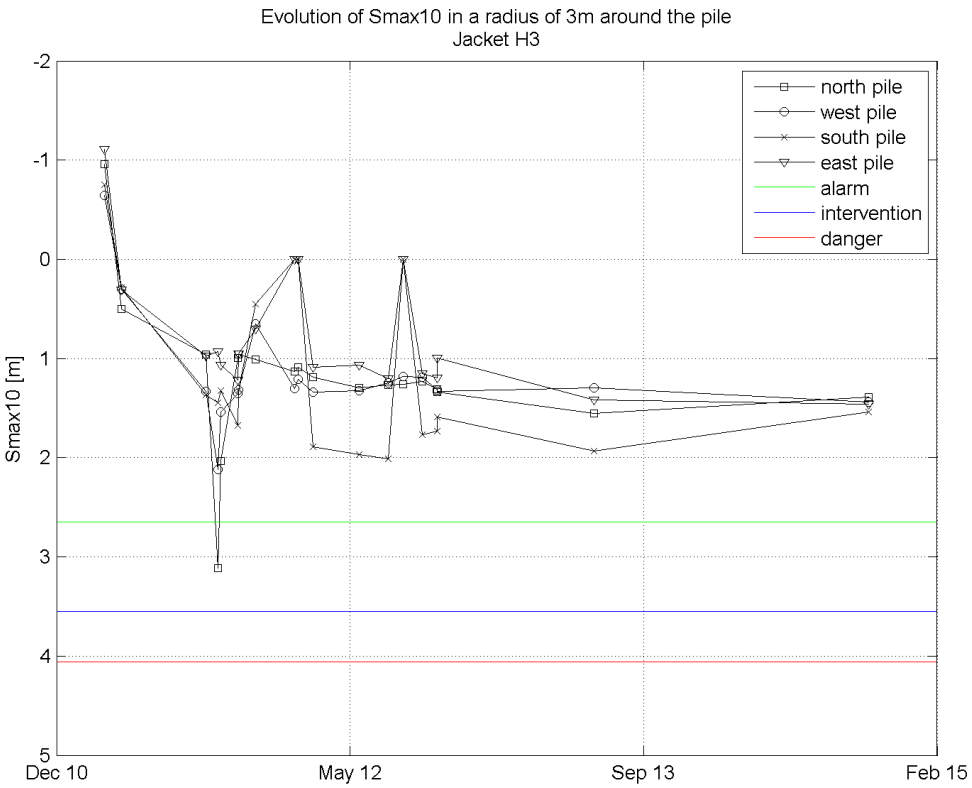

Evolution of Smax10 in a radius of 3m around the pile
Jacket G2
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Mar 10
Sep 10
Apr 11
Oct 11
May 12
Nov 12
Jun 13
Jan 14
Jul 14
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

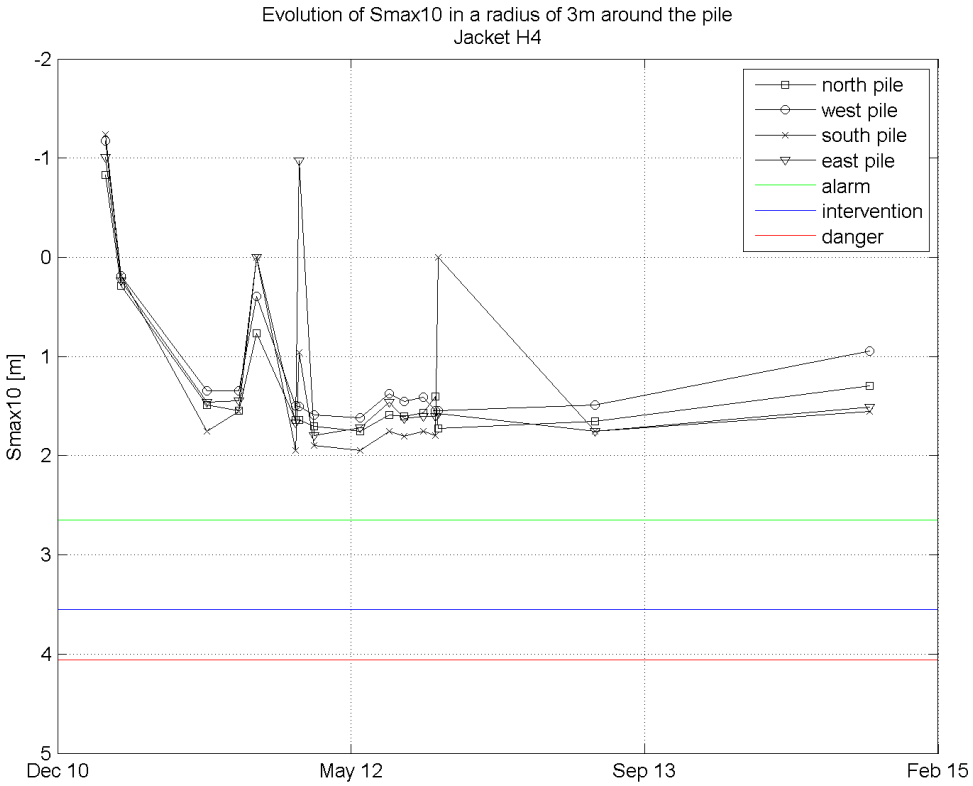

Evolution of Smax10 in a radius of 3m around the pile
Jacket G3
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

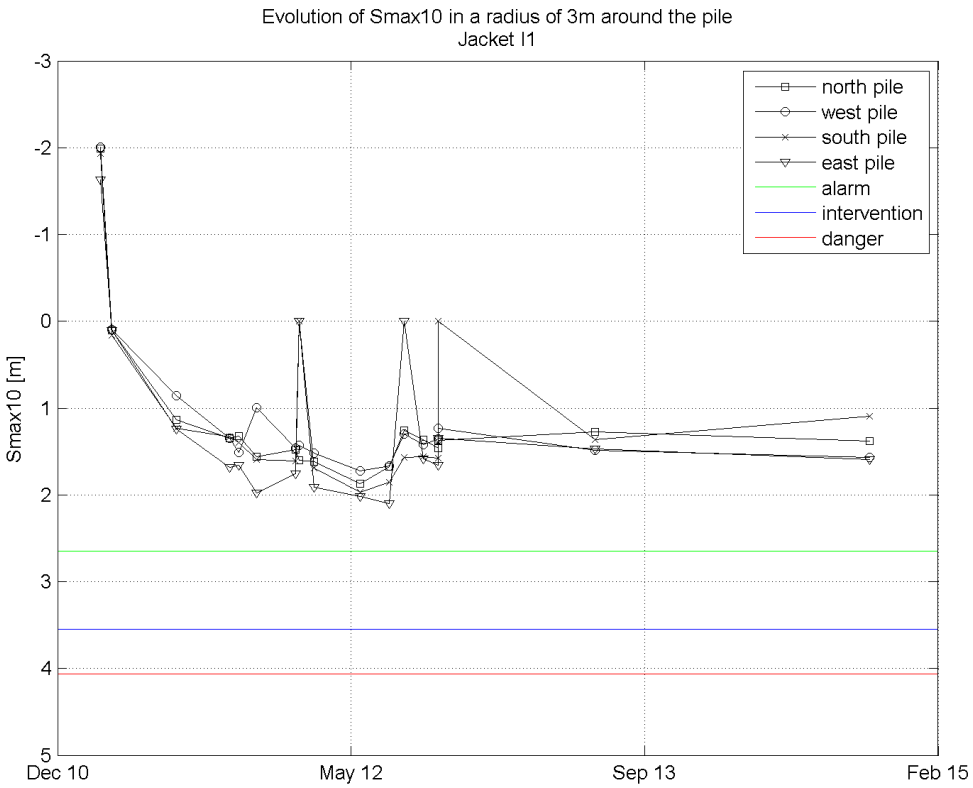

Evolution of Smax10 in a radius of 3m around the pile
Jacket G4
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

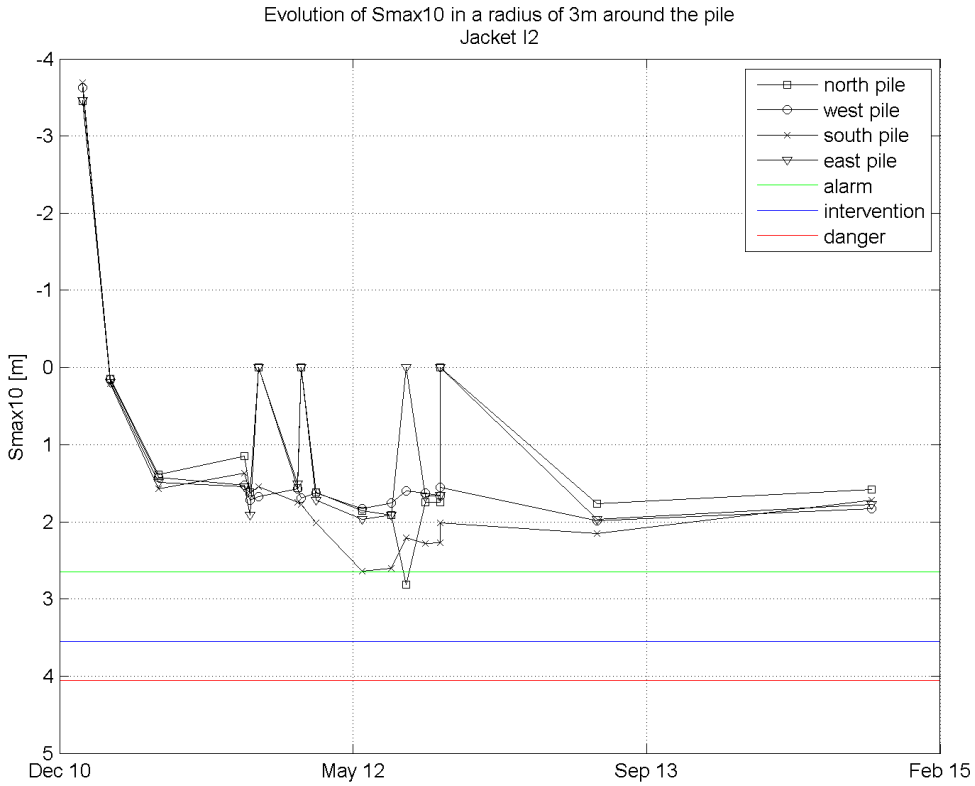

Evolution of Smax10 in a radius of 3m around the pile
Jacket H1
Smax10 [m]
-5
-4
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

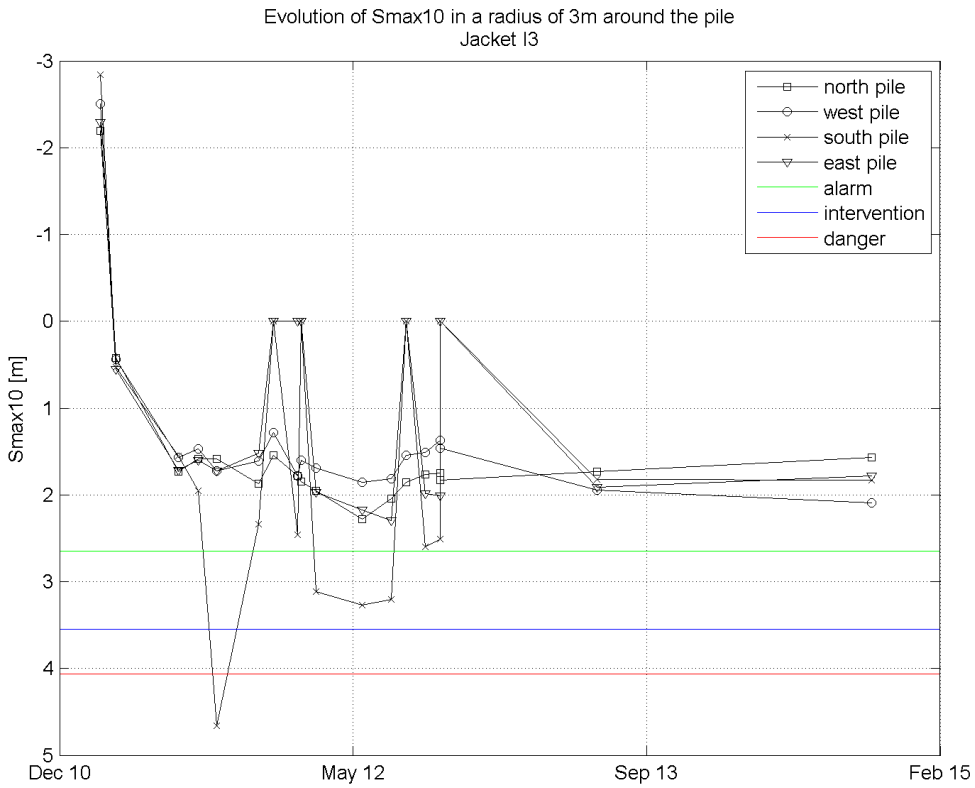

Evolution of Smax10 in a radius of 3m around the pile
Jacket H2
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

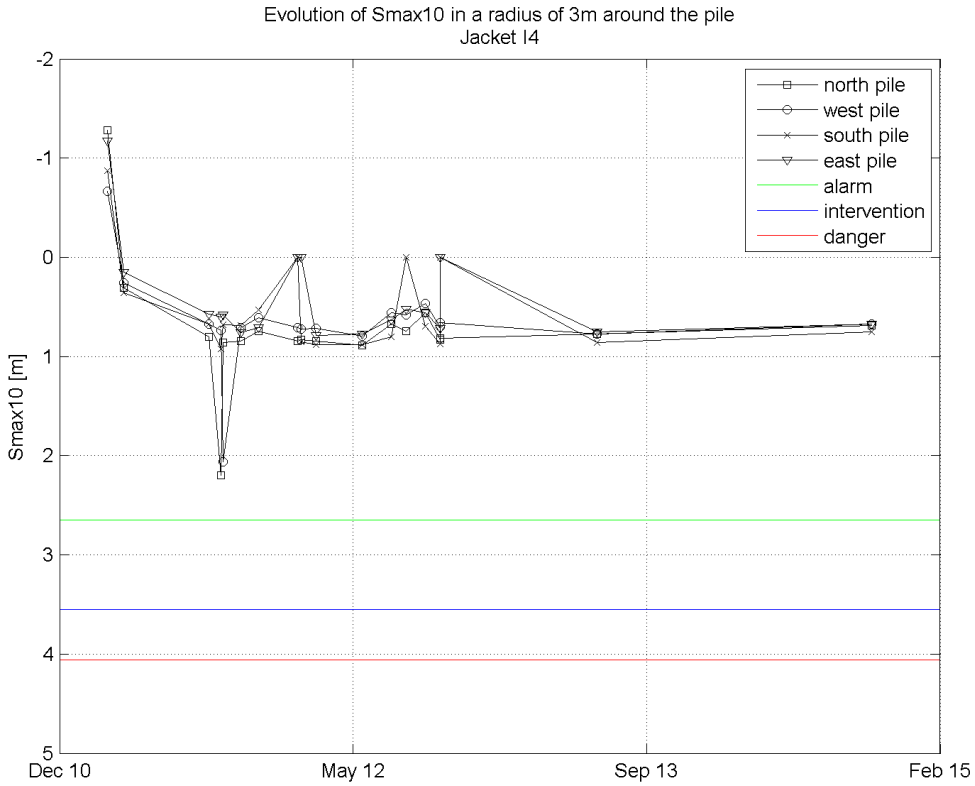

Evolution of Smax10 in a radius of 3m around the pile
Jacket H3
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

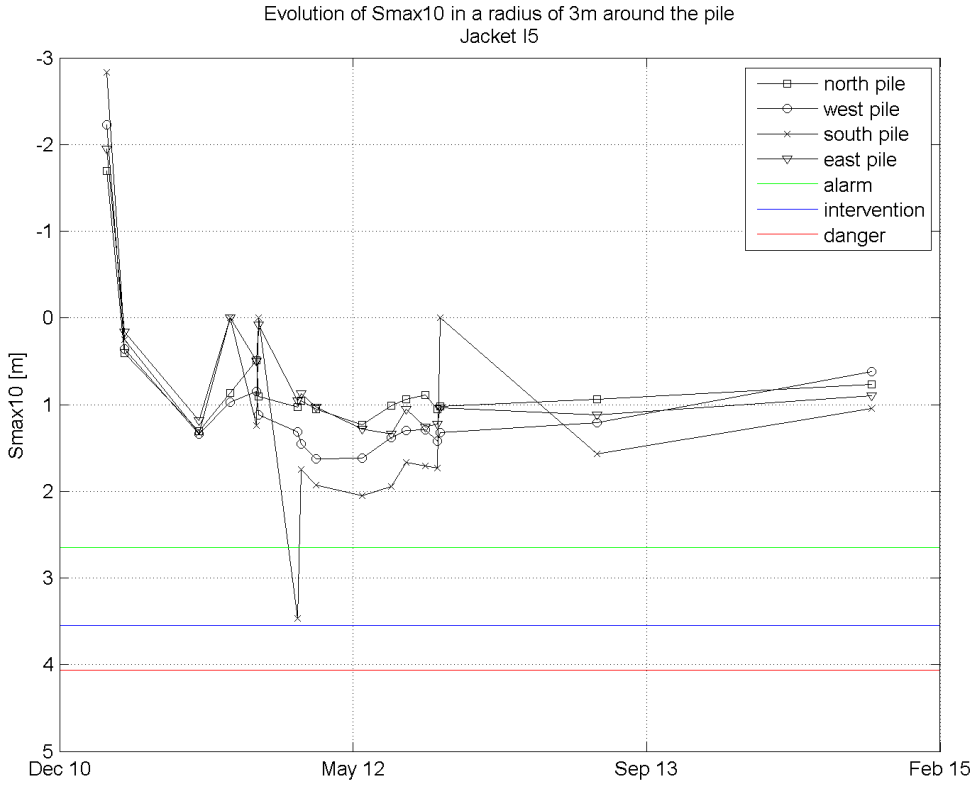

Evolution of Smax10 in a radius of 3m around the pile
Jacket H4
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

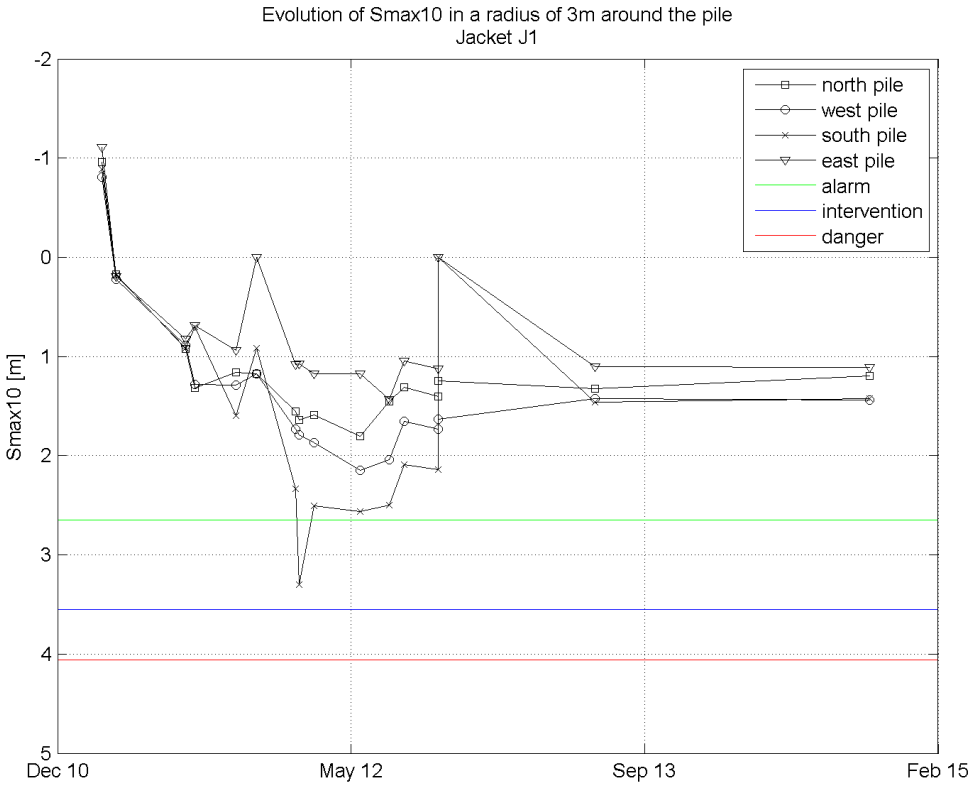

Evolution of Smax10 in a radius of 3m around the pile
Jacket I1
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger

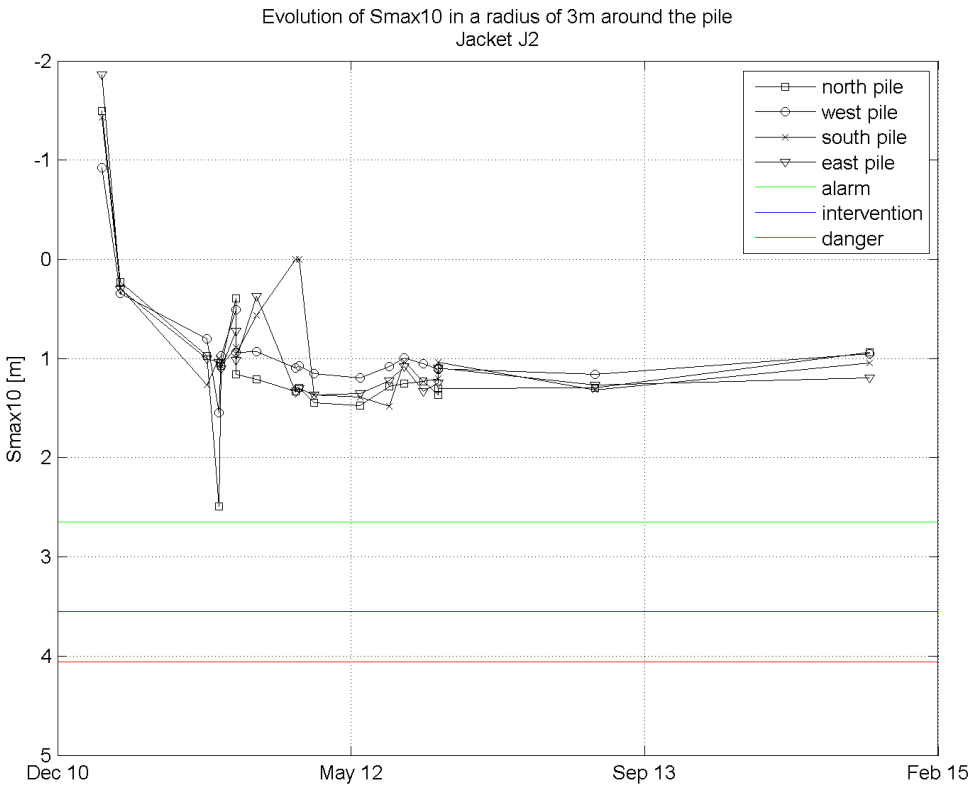

Evolution of Smax10 in a radius of 3m around the pile
Jacket I2
Smax10 [m]
-4
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket I3
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket I4
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket I5
Smax10 [m]
-3
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket J1
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger


Evolution of Smax10 in a radius of 3m around the pile
Jacket J2
Smax10 [m]
-2
-1
0
1
2
3
4
5
Dec 10
May 12
Sep 13
Feb 15
north pile
west pile
south pile
east pile
alarm
intervention
danger