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The deformation monitoring of the Arles Rhone 3 Roman barge

Daniela Peloso, Marie-Laure Courboules, Vincent Dumas

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14th ICOM-CC Wet Organic Archaeological Materials Working Group Conference

The deformation monitoring of the Arles Rhone 3 Roman barge

D. Peloso, M-L Courboulès, V. Dumas

introduced by A. Colson and H. Bernard Maugiron



Musée
départemental
Arles antique

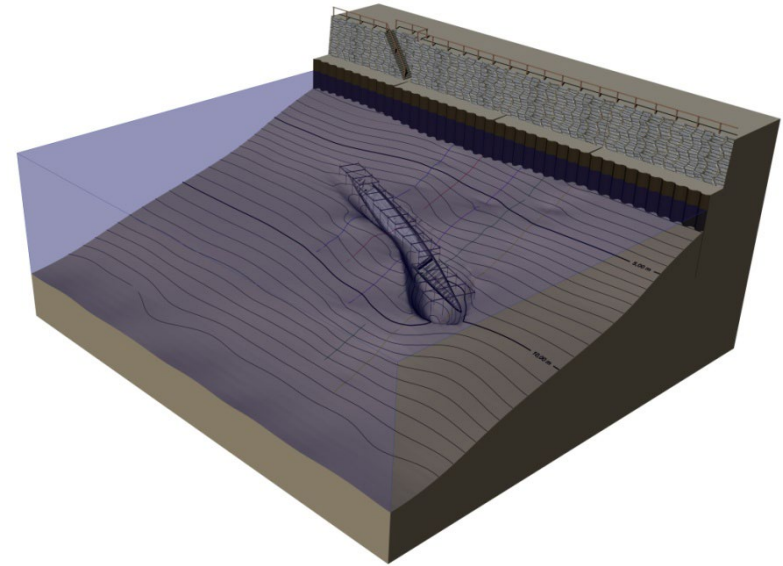
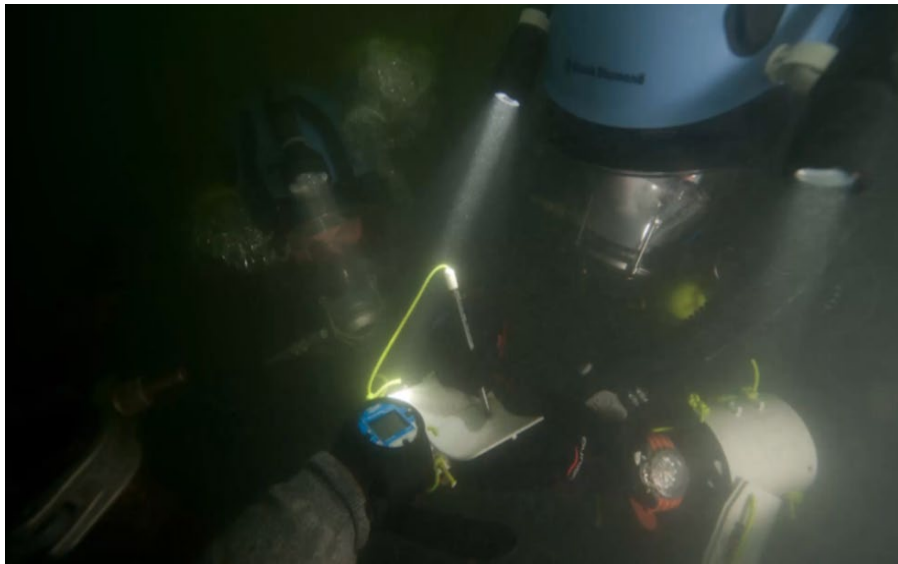
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Bureau d'Étude et de Recherche
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ARC-nucle ART

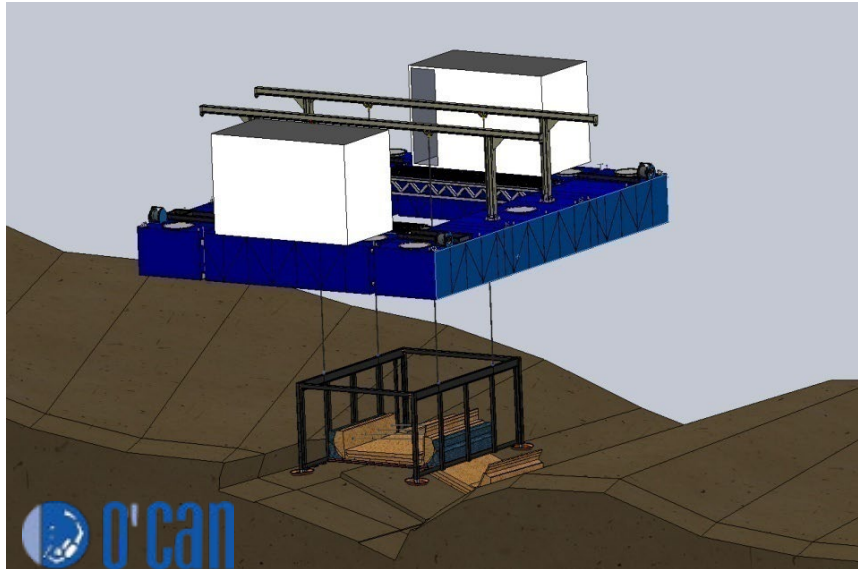
 **Centre Camille Jullian**
Histoire et archéologie de la Méditerranée et de l'Afrique du Nord
de la Protohistoire à la fin de l'Antiquité

 **drassm**  **A-CORROS**
DÉPARTEMENT DES RECHERCHES ARCHÉOLOGIQUES
SUBAQUATIQUES et SOUS-MARINES

Discovery and excavations in the Rhône river

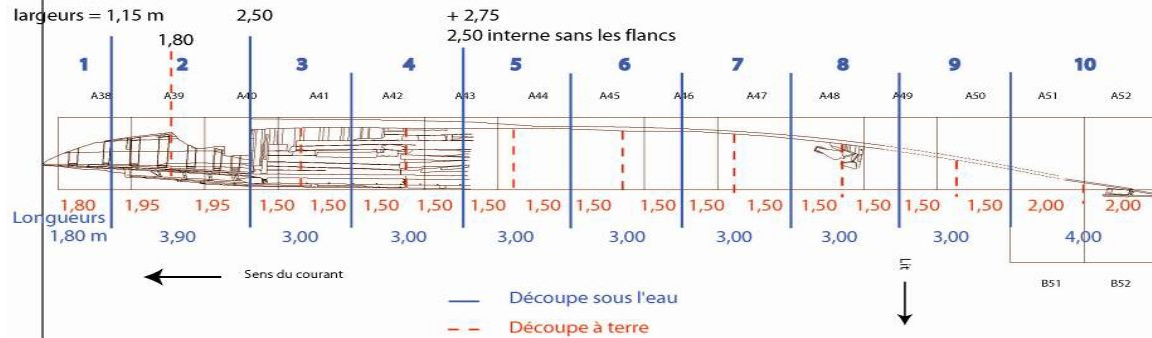


The excavation and raising of the river



Arles-Rhône 3

Longueur totale = 30,70 m



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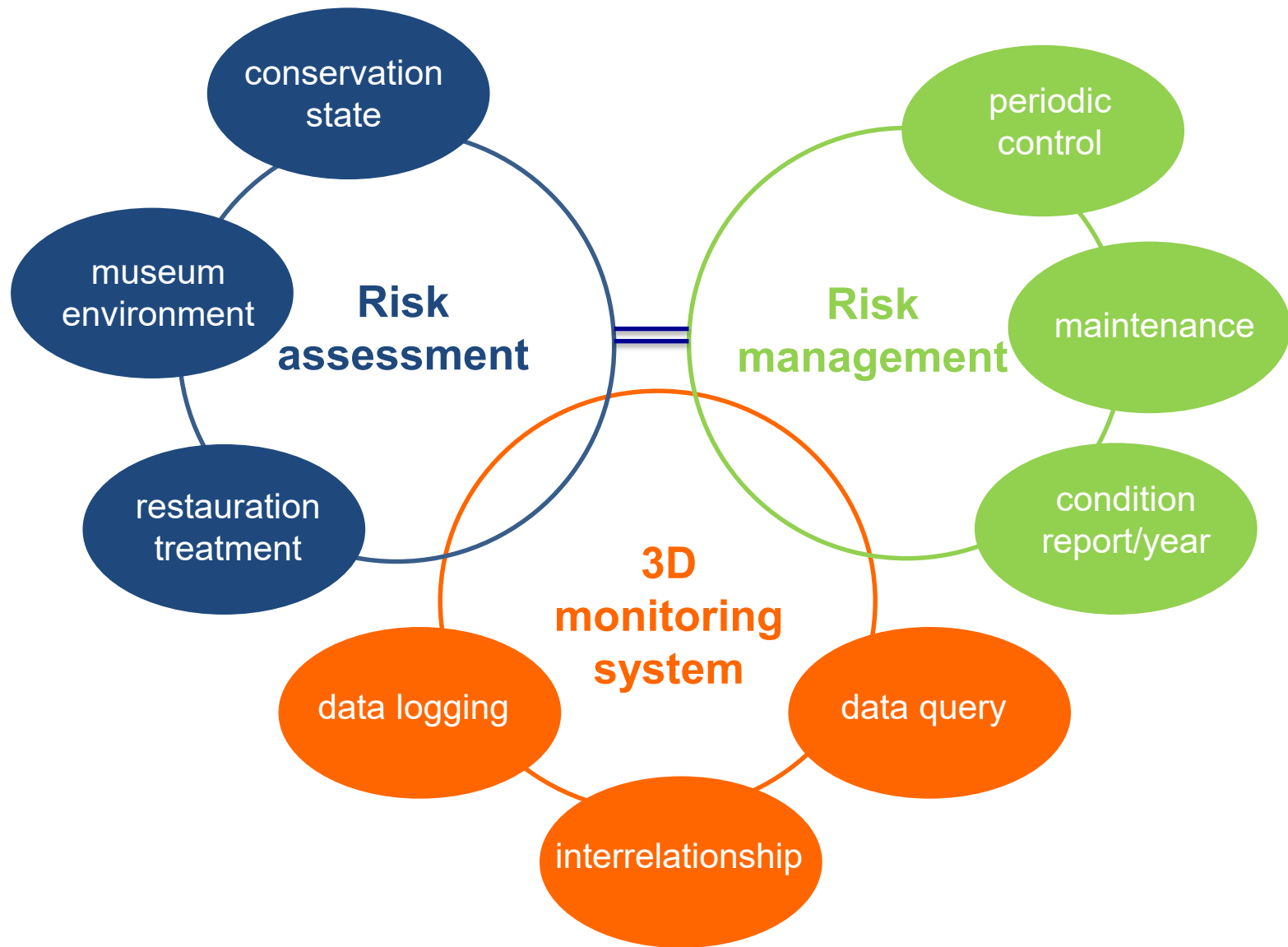
Conservation treatment and laboratory processing



The boat in the museum



Background of the “Arles Rhône 3” monitoring protocol since 2013



The “Arles Rhône 3” monitoring protocol (2015/2019)



The “Arles Rhône 3” monitoring protocol step by step



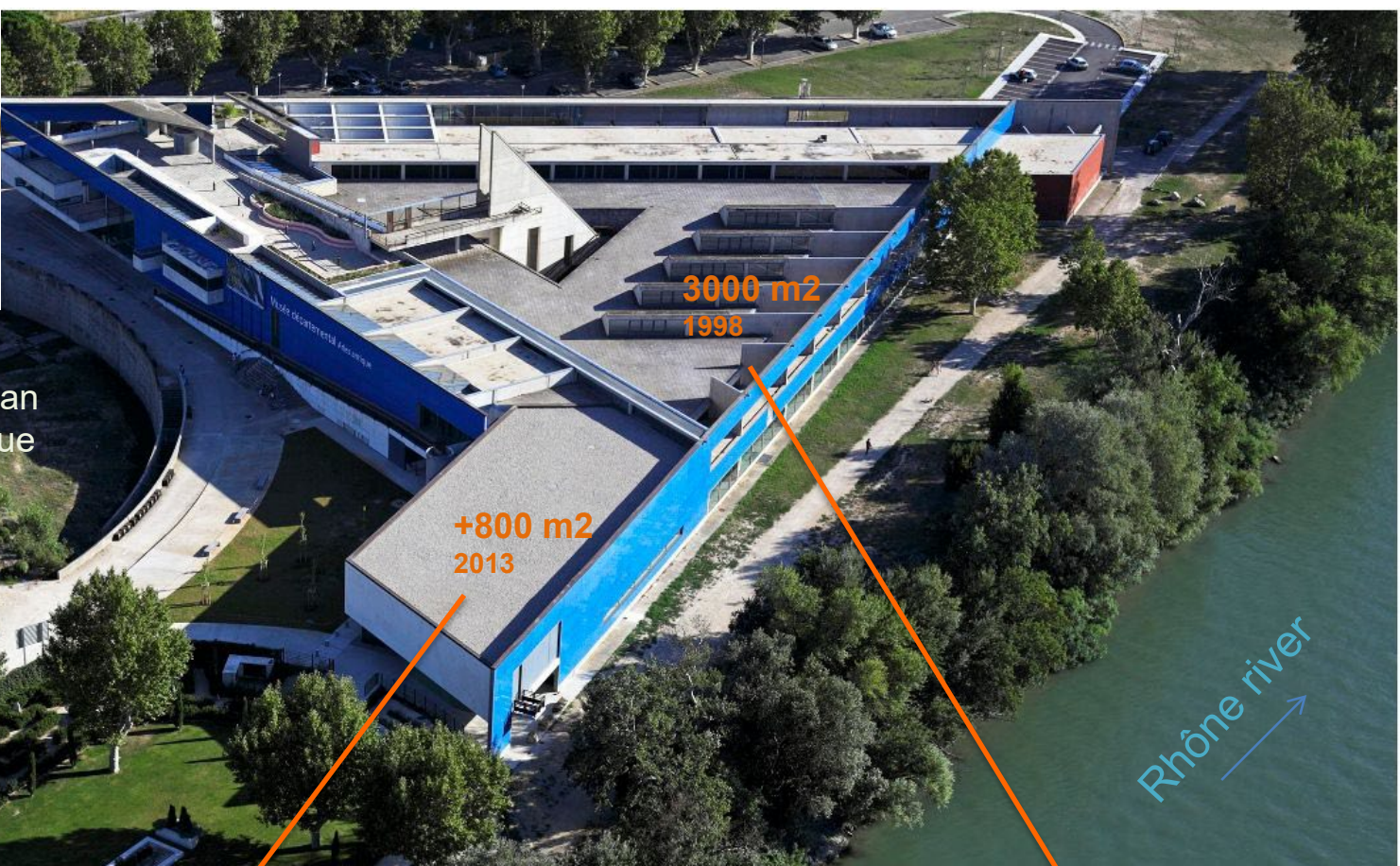
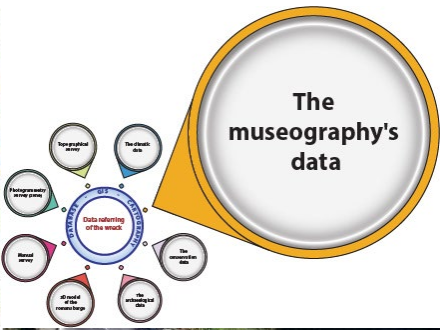


Manual measurements between sections



2013 à 2016 (section T9-T8)

| Nominal | | Insatisfaisant | | Nul | |
|--------------|--|----------------|--|--------|--|
| Satisfaisant | | Avertissement | | Calcut | |
| Type | | | | | |
| | | | | | |
| | T8/T9 bâbord | | T8/T9 tribord | | |
| | T8A04 n°5 et T8A05 n°5 | | | | |
| avant | T8A04 n°5 : mesure entre têtes épingles 12,1cm écartement : 1,20m ; T8A05 n°5 : mesure entre têtes épingles 12,17cm écartement : 1,80m | | joint T8/T9 : bords encore bien serrés ; fissure en haut à gauche du bras de soutien | | |
| | | | | | |
| | T8A04 n°5 : mesure entre têtes épingles 12,8cm écartement : 1,30m ; T8A05 n°5 : mesure entre têtes épingles 12,8cm écartement : 1,40m | | Bords encore serrés | | |
| | T8A04 n°5 : mesure entre têtes épingles 12,80cm écartement : 1,82cm ; T8A05 n°5 : mesure entre têtes épingles 12,8cm écartement : 1,43cm | | Bords serrés, T8 semble peu maintenu par le bras et fissure à surveiller | | |
| | T8A04 n°5 : mesure entre têtes épingles 12,788cm T8A05 n°5 : mesure entre têtes épingles 12,742cm | | | | |



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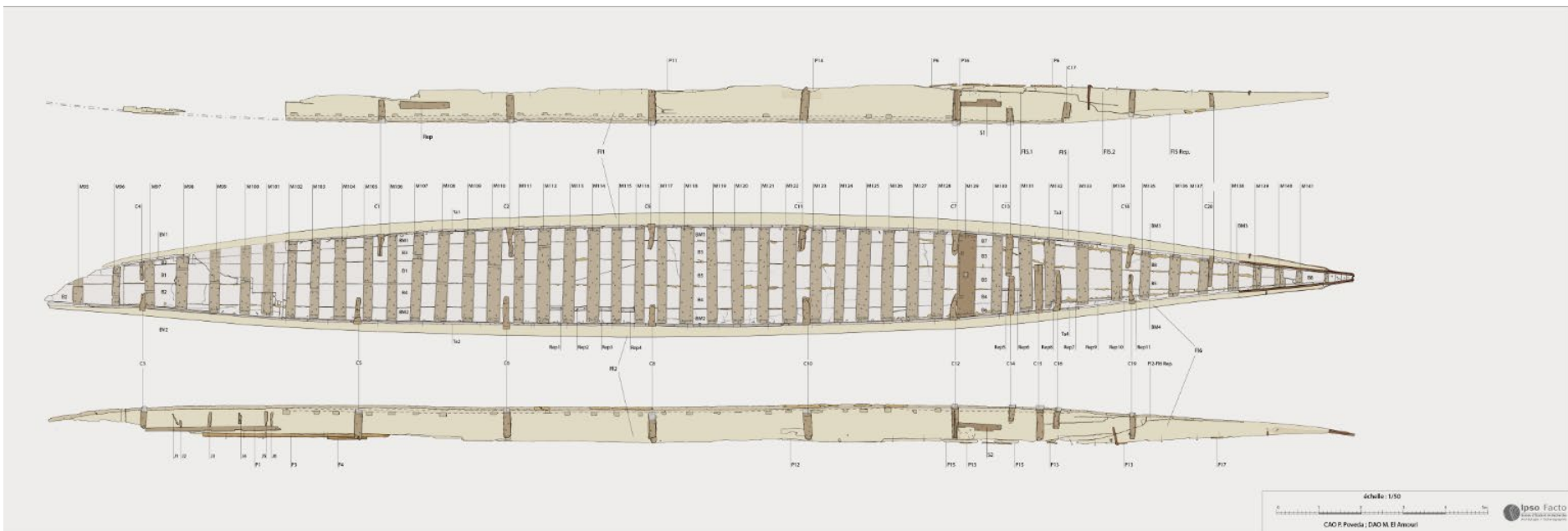
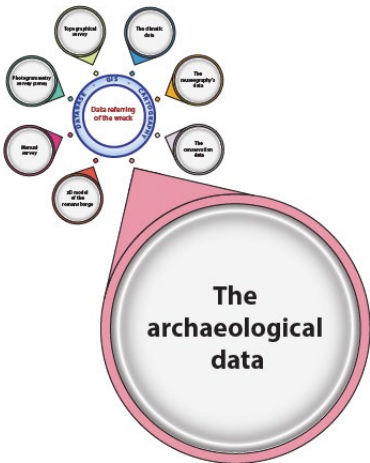




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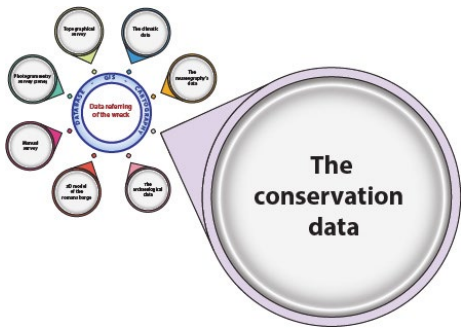




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Annual condition report

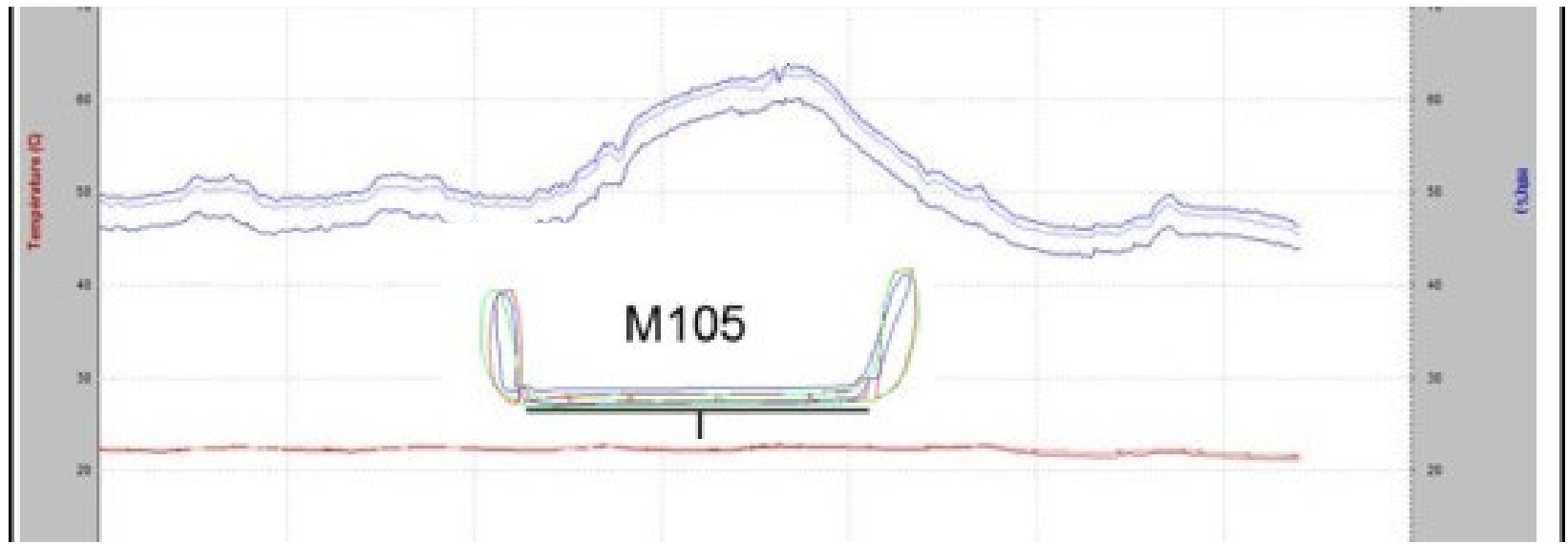
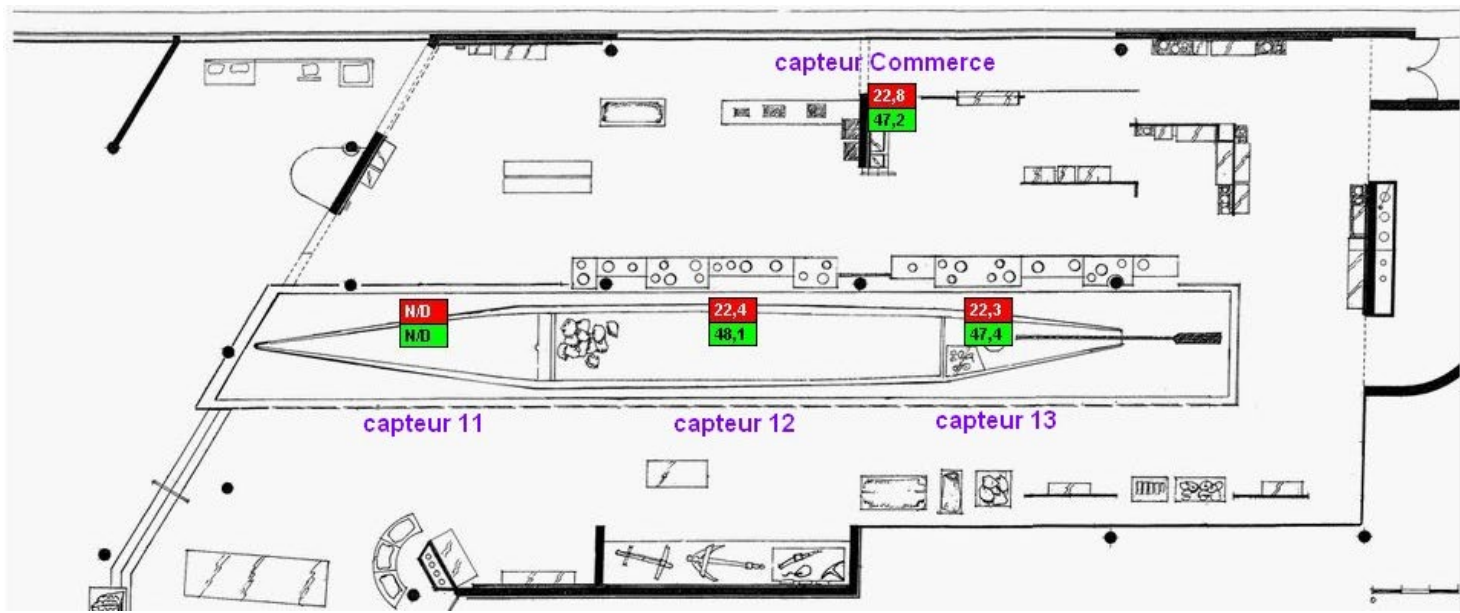


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The climatic data



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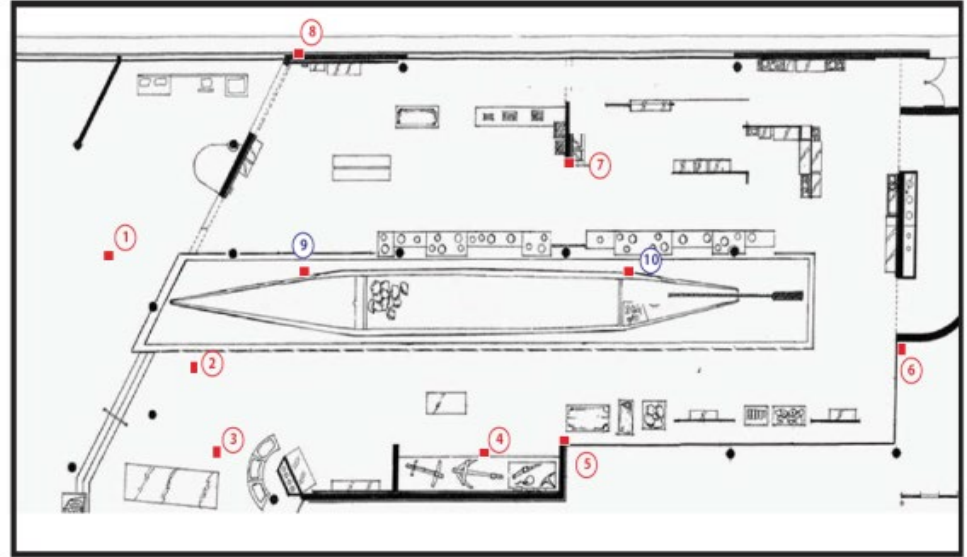
Topographical survey



The topographical survey



Proposition de positionnement des prises



— Référence de positionnement
— Contrôle mouvement du fond de fosse

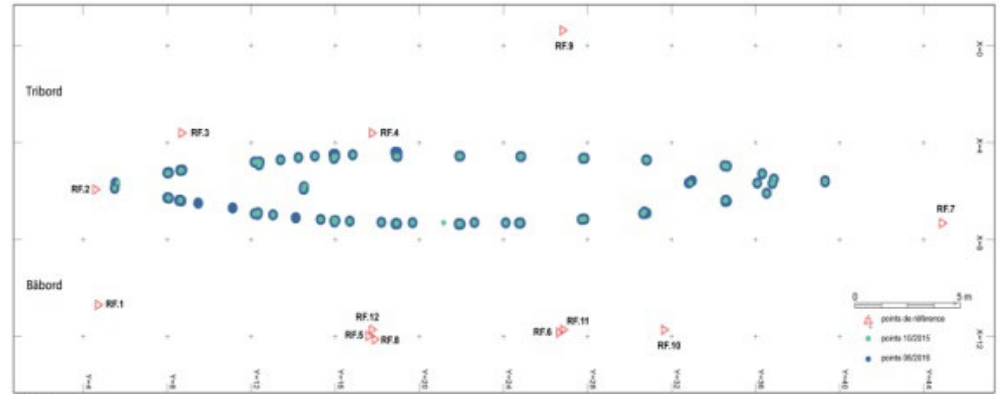
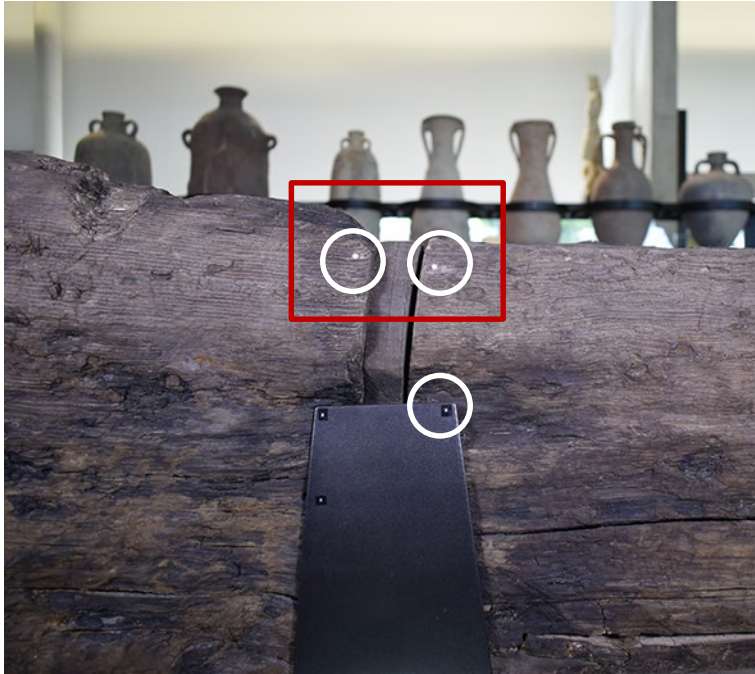


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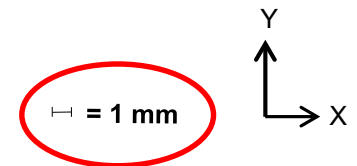
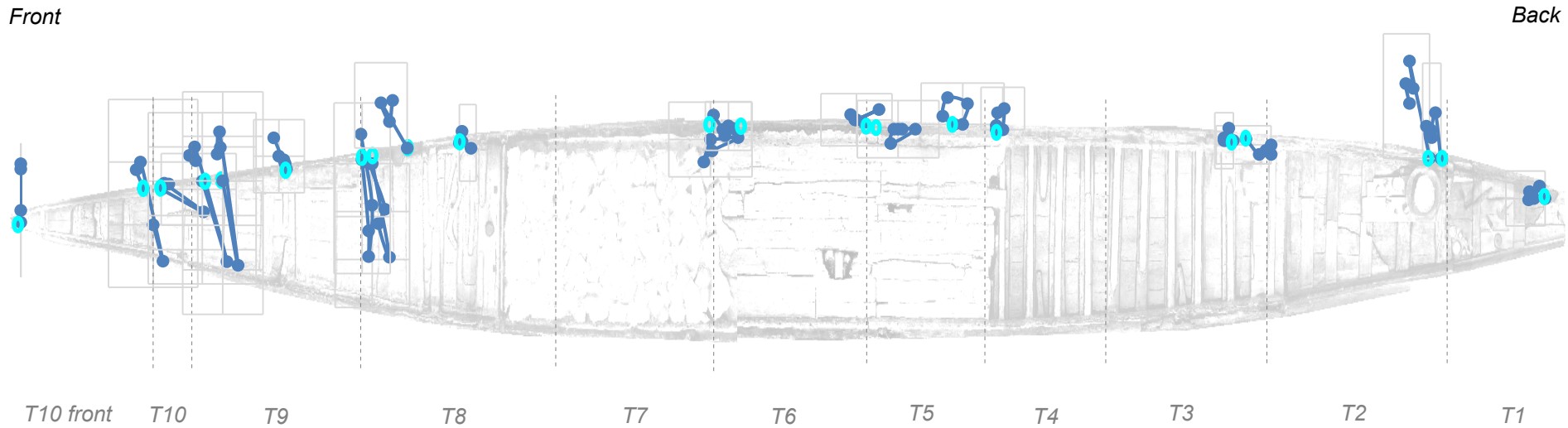
The topographical survey



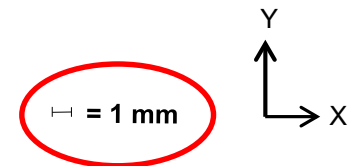
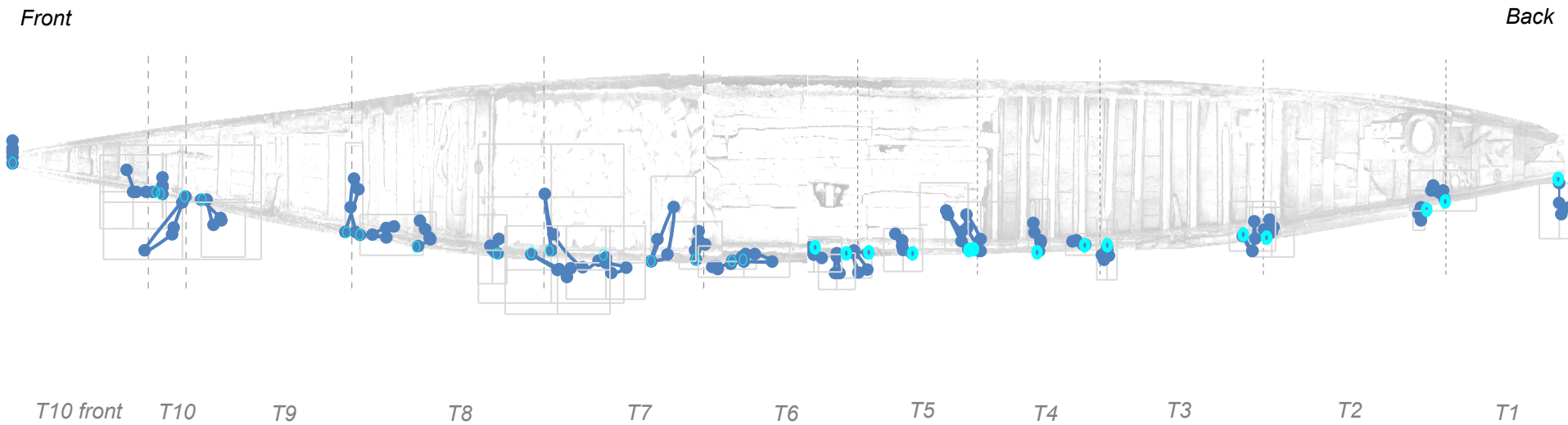
DUMAS Vincent,
Aix-Marseille Univ, CNRS, MCC, CCL, Centre Camille Jullian, F-13000, Aix-en-Provence, France - 2016



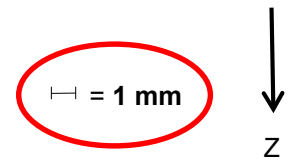
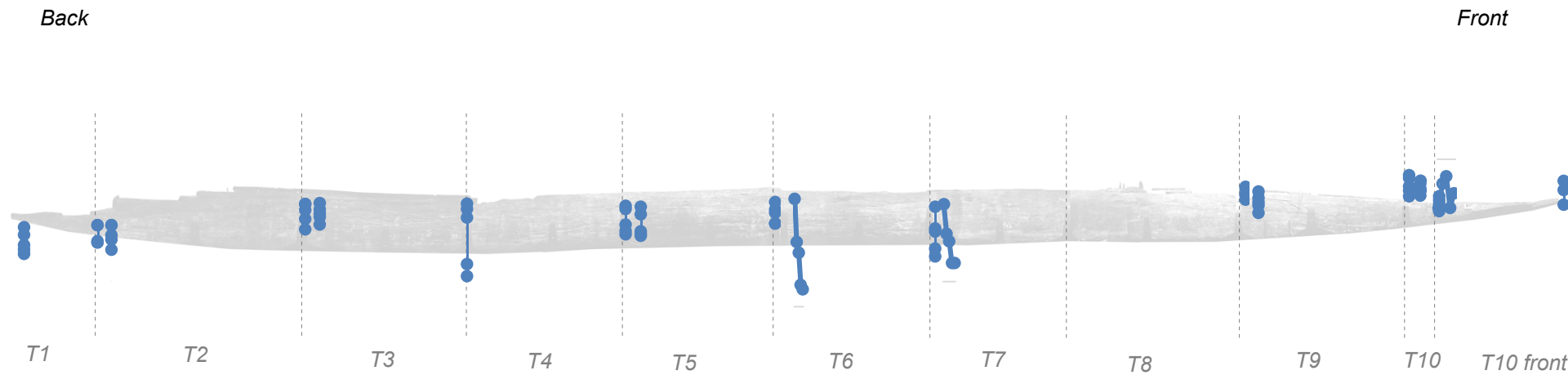
Port side – The variations on two dimensions (x,y)



Starboard Side – the variations on two dimensions (x,y)



Port side – the variations on z dimension

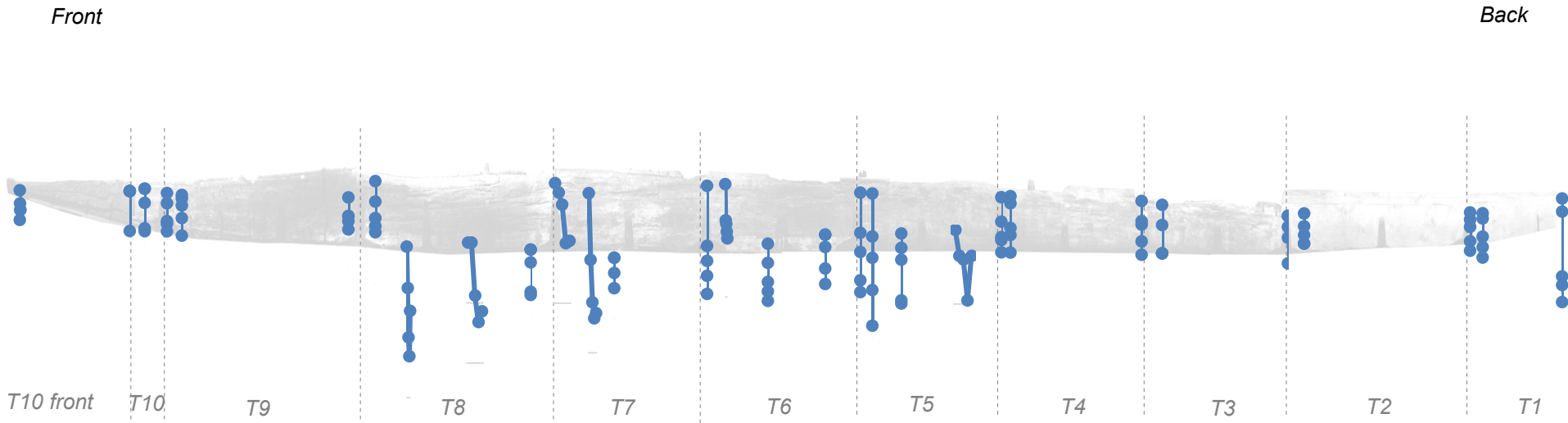


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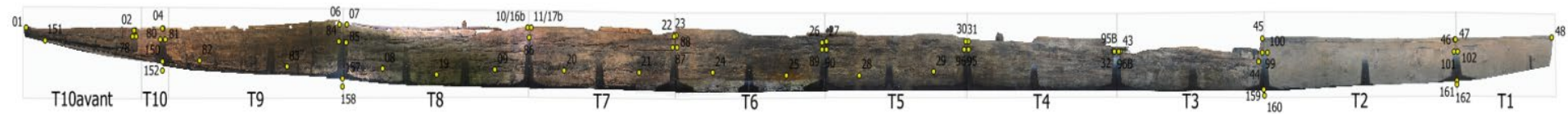


Starboard side – the variations on z dimension



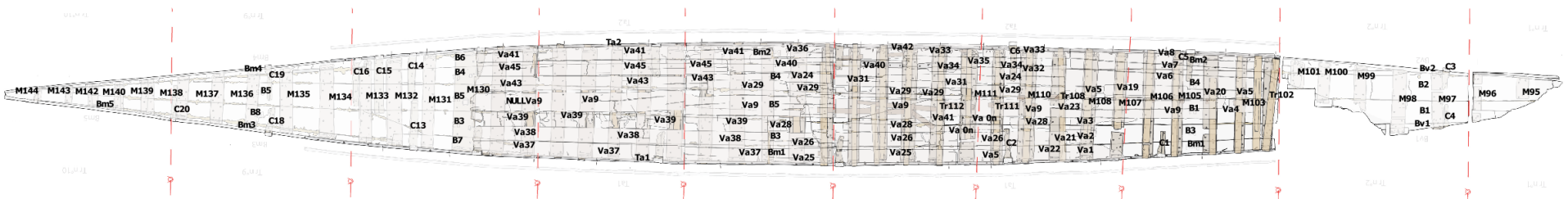
Information system

Orthoimage



Echelle 1:63

Archeological maps



Echelle 1:63



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The deformation monitoring of the Arles Rhone 3 Roman barge



Relational database



CEZ2016_BOIS MATERIAUX

Date: 2016-12-07
Année: 2016
NomRéf: MLCourboules
Equipe: MdAa

TROU/CON

T10 avant
T10
T9
T8
T7
T6
T5
T4
T3
T2
T1

MAT

Mât1%avB
Mât1%avT
Mât1%arrB
Mât1%arrT

BORDE'

BBE
BB1
BTE
BT1

SOLE

1/2SoleAv
1/2SoleArr

CEZ2016_BOIS MATERIAUX

BOIS

CAT ALTERATION BOIS

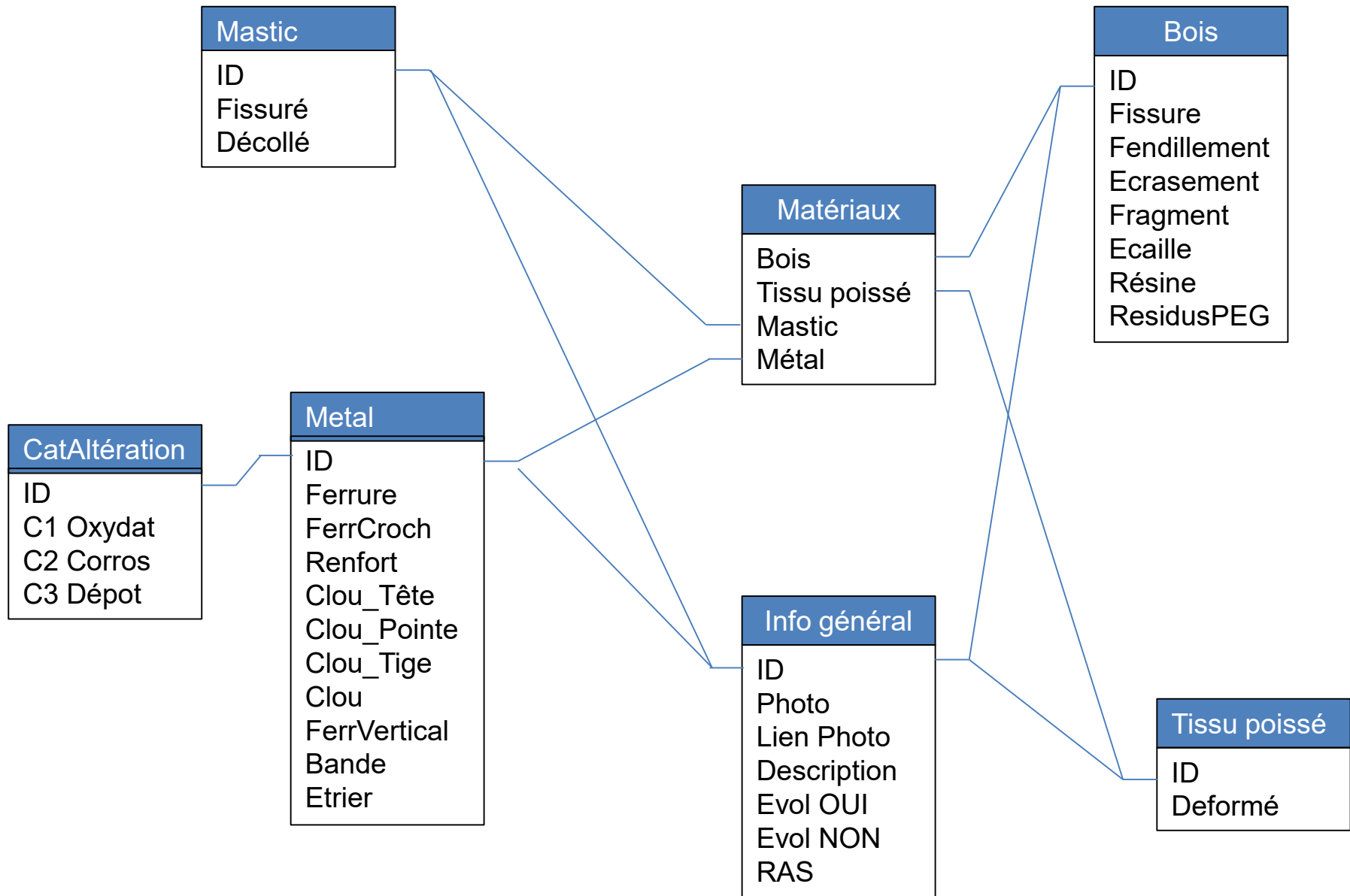
Fissure
Fendillem
Ecrasement
FragDetach
Ecaille
SouRésine
RésineN/Br
RésidusPEG
B_Evol_OUI
B_Evol_NON
B_RAS
DescrCatB: NULL

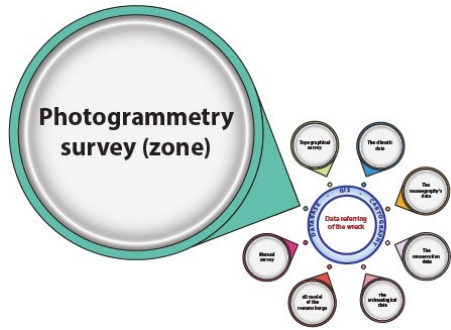
PhotoBOIS

D:\ARLES\SIG_AR3\PHOTO\CE3_2016_BOIS\DSC0060.jpg

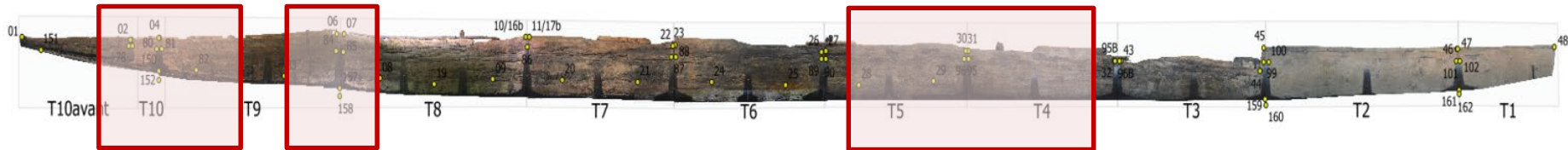
TISSU POISSE'

Deformé
TP_EvolOUI
TP_EvolNON
TP_descrip: NULL
PhotoTP: NULL



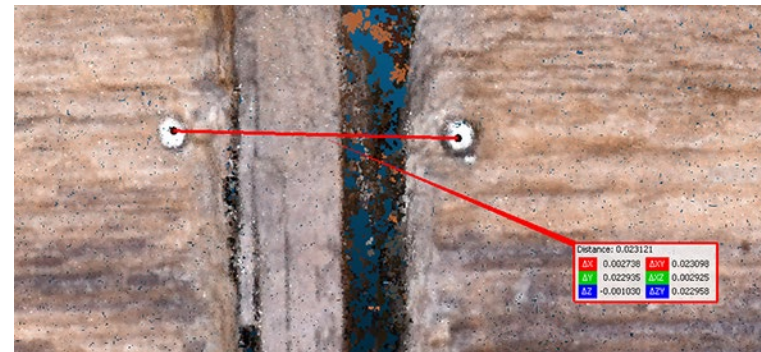


Photogrammetry survey (zone)

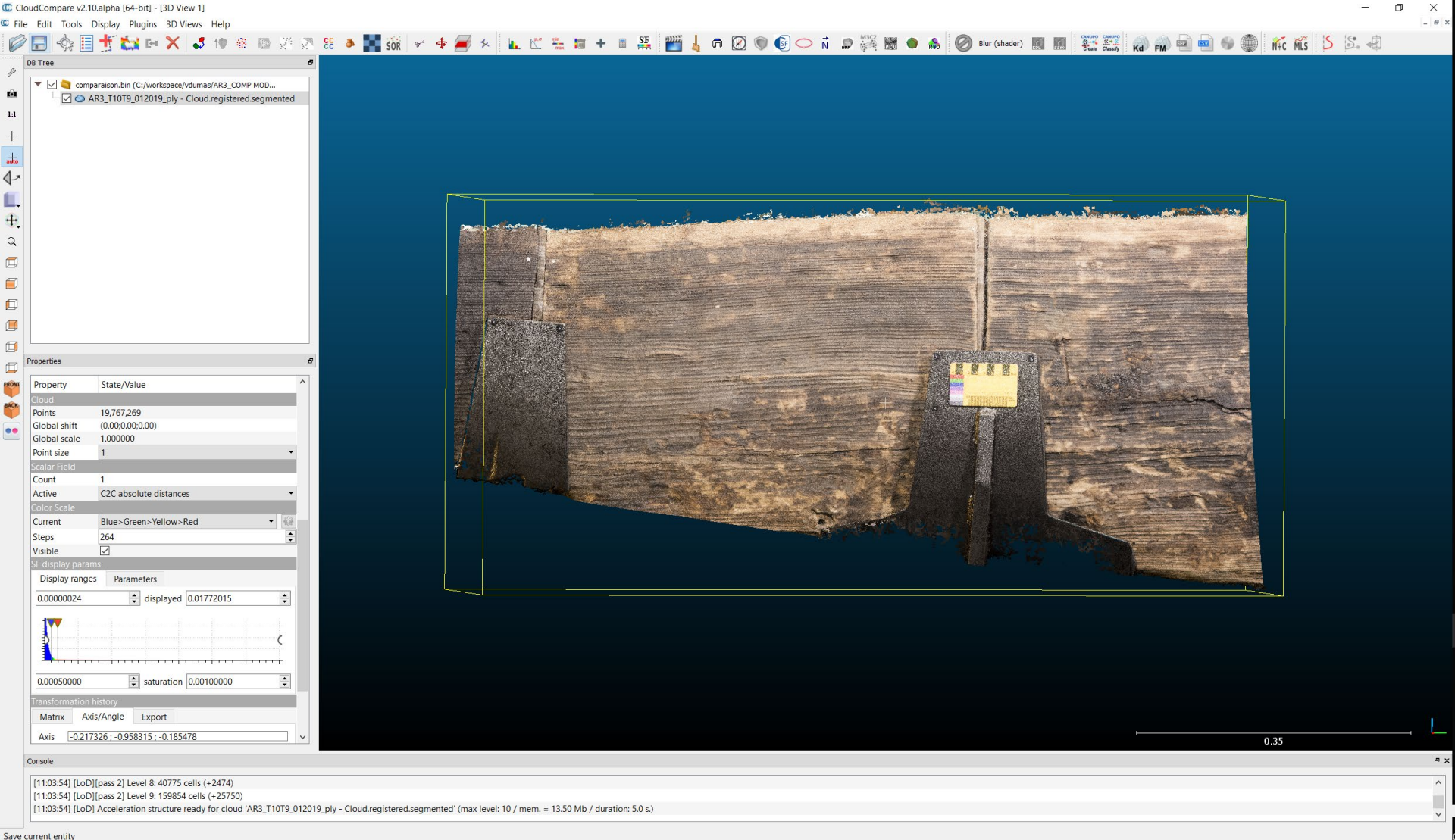


T9-T10

| | Levé tachéomètre 2018_12 | Mesure sur facsimilé 2018_12 | Mesure sur facsimilé 2019_01 | Mesure manuelle |
|-------------------------|--------------------------|------------------------------|------------------------------|-----------------|
| Tronçon T4-T5 (pt30-31) | 0.0587 | 0.0584 | 0.0584 | |
| Tronçon T8-T9 (pt 6-7) | 00.1528 | 0.1520 | 0.1543 | |
| Tronçon T9-T10 (pt 4-5) | 0.0231 | 0.0232 | 0.231 | |



T9-T10



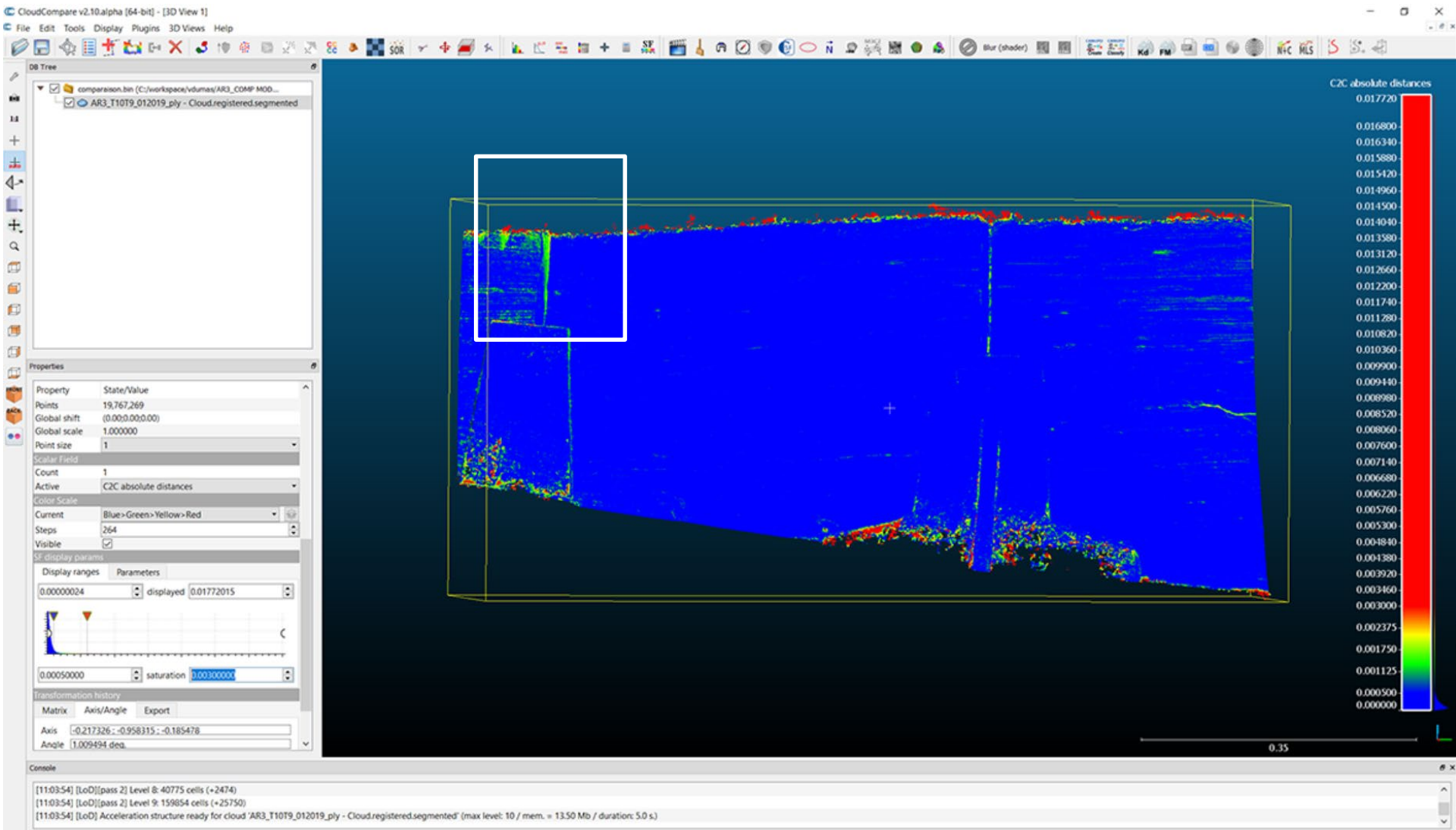
2019 : dense cloud (26 000 000 pts)



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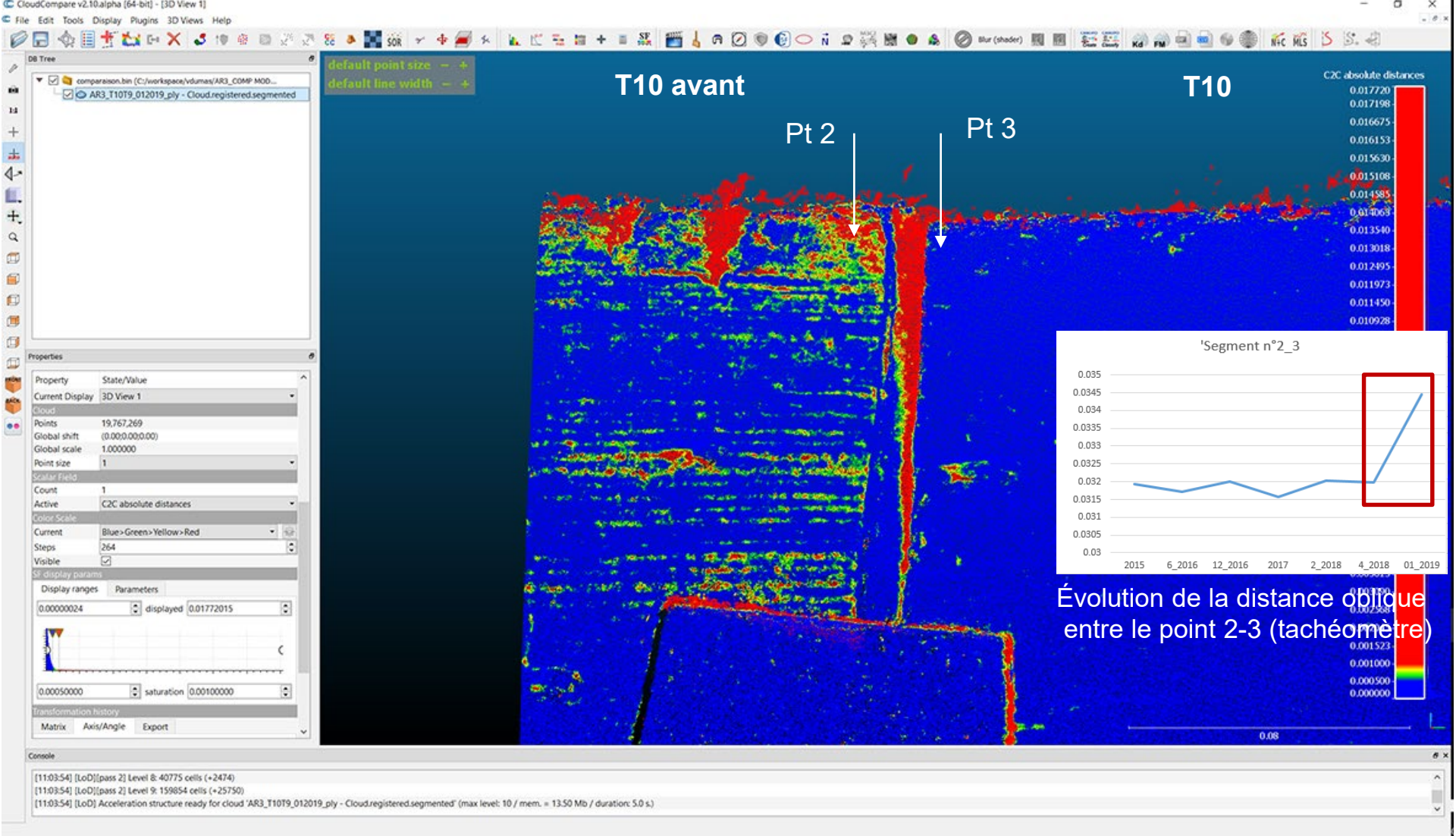
T9_10 : 04/2018_01/2019 : dense cloud compare



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T10_10 front : 04/2018_01/2019 : dense cloud compare



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A work in progress



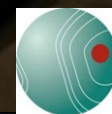
the future objectives :

- continue to development the database
- develop the link between data
- link the database directly to the 3D model
- produce a dedicated application
- A direct measurement the pH data on the boat
- correlate 3D movements and climate changes

Merci pour votre
attention
Thank you for your
attention.



Musée
départemental
Arles antique



Ipso Facto

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