



Thurs May 1st 2014

Liverpool

The case is cracked

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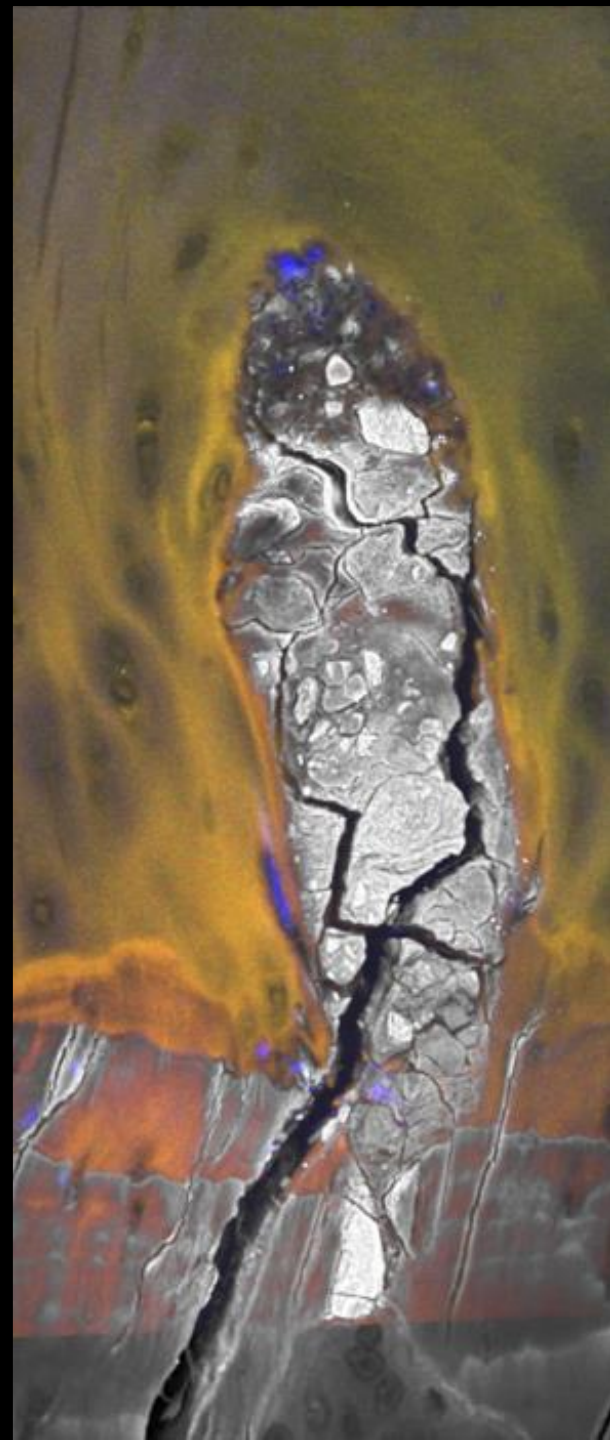
What are we dealing with?

- HAC hyaline articular cartilage
- ACC articular calcified cartilage
- SCB subchondral bone
- MF mineralising front (tidemark) of ACC
- OA osteoarthritis, human and horse
- POD palmar osteochondral disease in horses
- PMMA poly-methyl-methacrylate
- BSE backscattered electrons in SEM
- CSLM confocal scanning light microscopy
- uCT, XMT x-ray microtomography
- uXR digital microradiography, Faxitron
- IKI solution of iodine in potassium iodide, triiodide
- AmmIII solution of iodine in ammonium iodide, triiodide
- IVAP iodine vapour staining



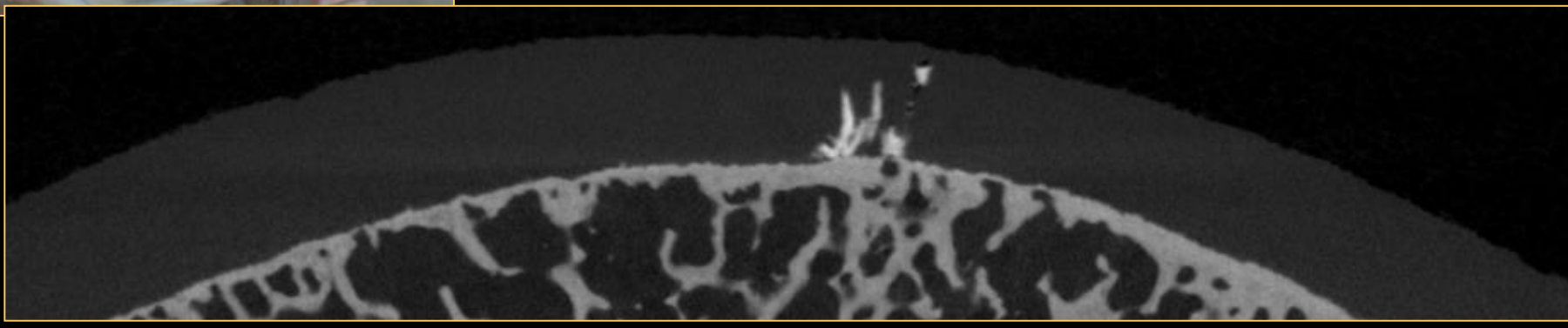
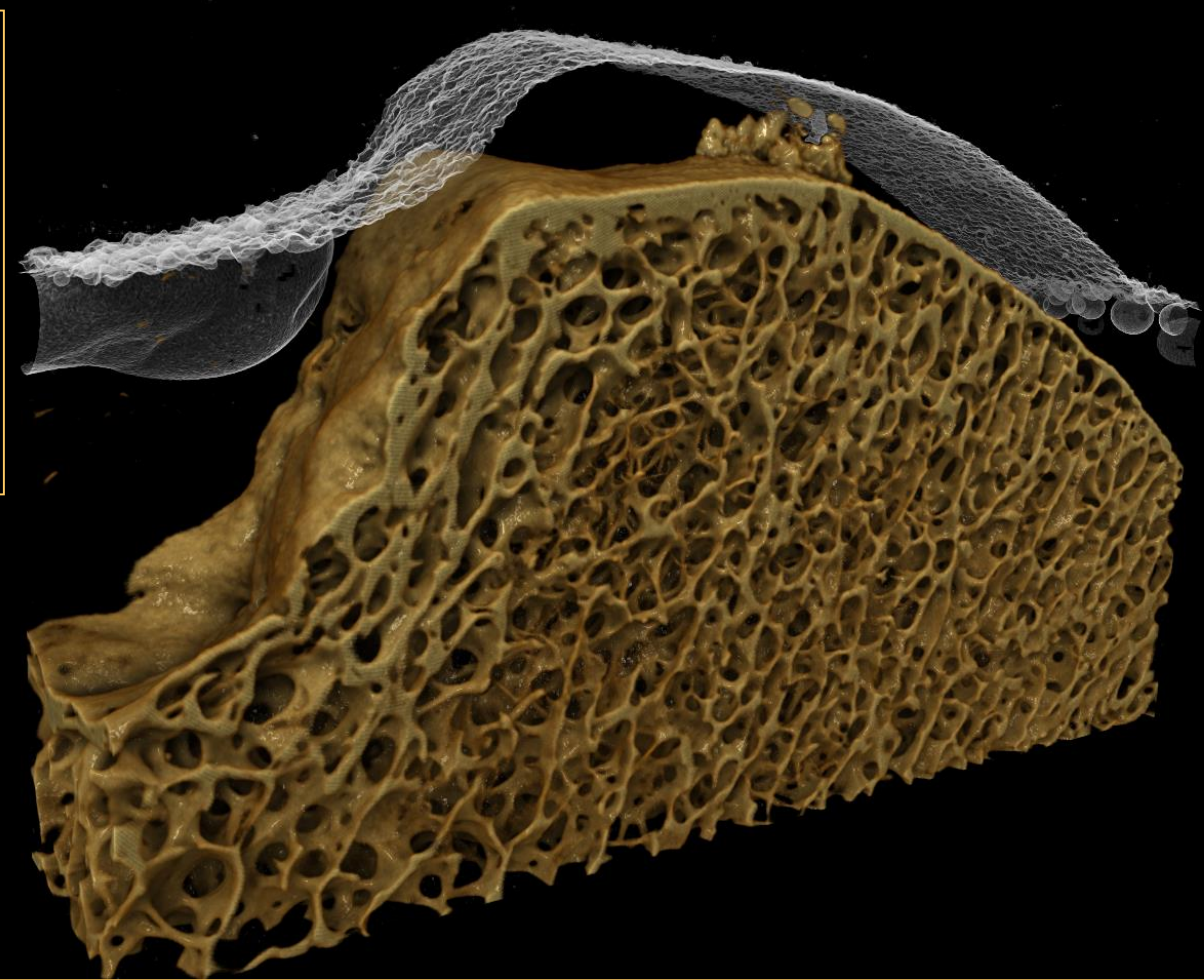
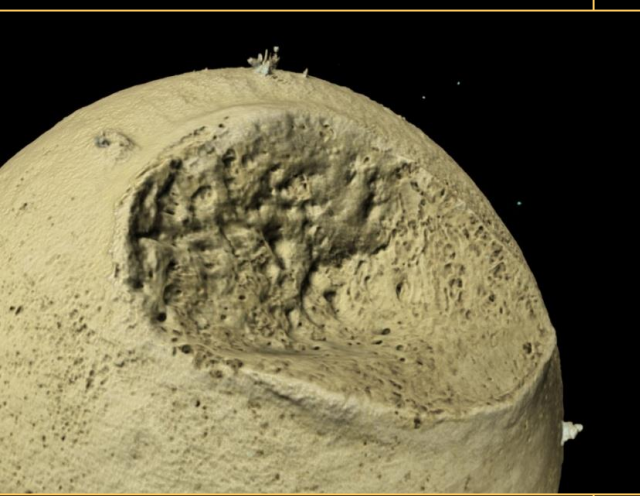
Field heights 636 μ m
Proc Anat Soc Jan 2010

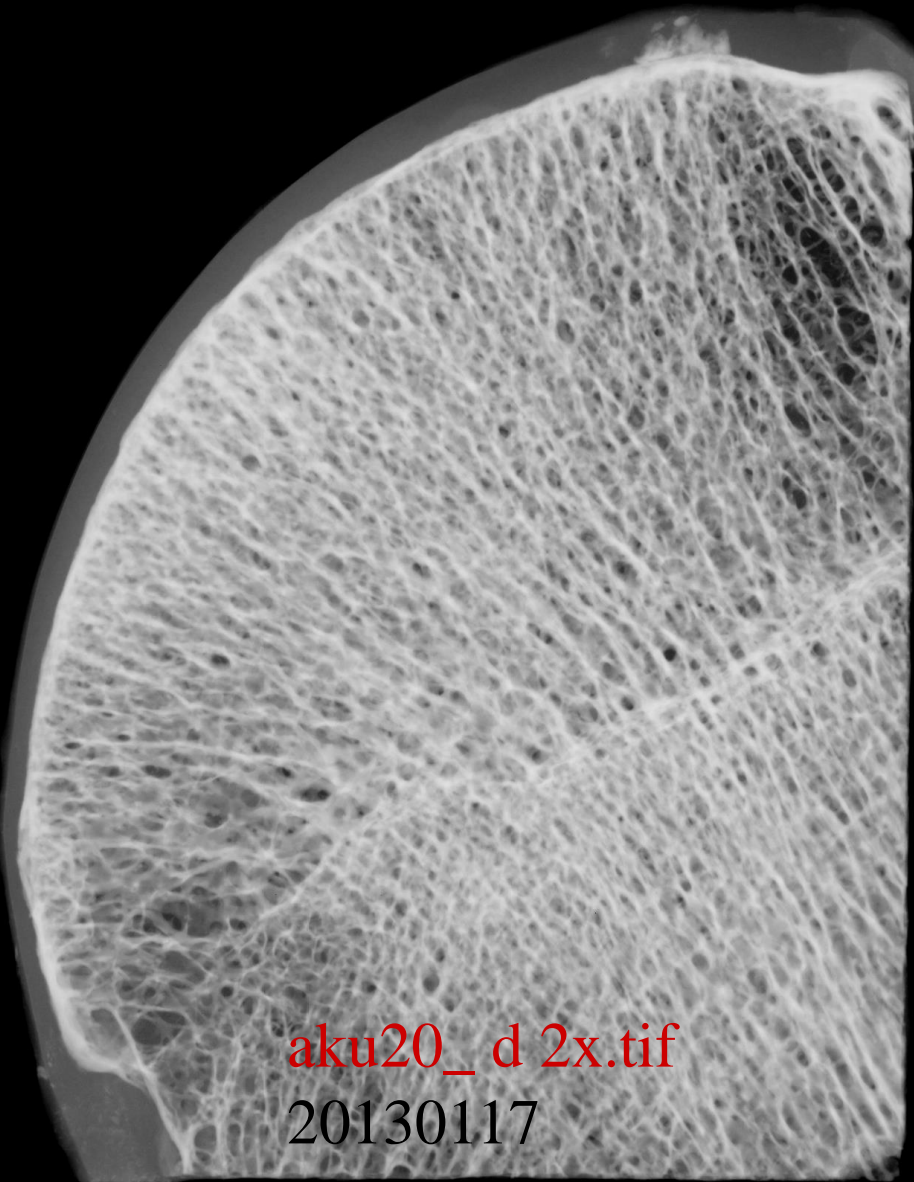
. Eur Cell Mater. 21:470-478 2011.



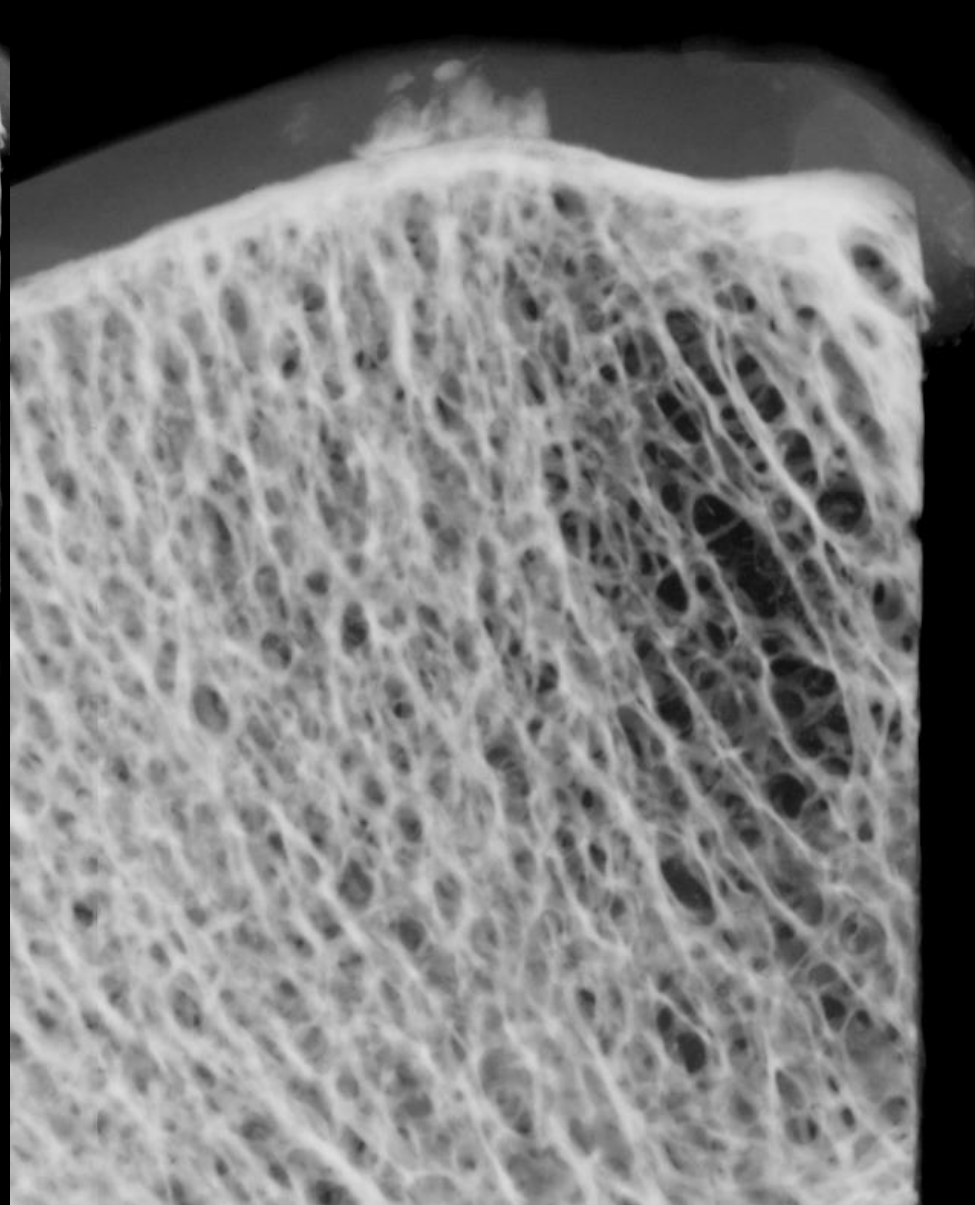
XMT GR Davis

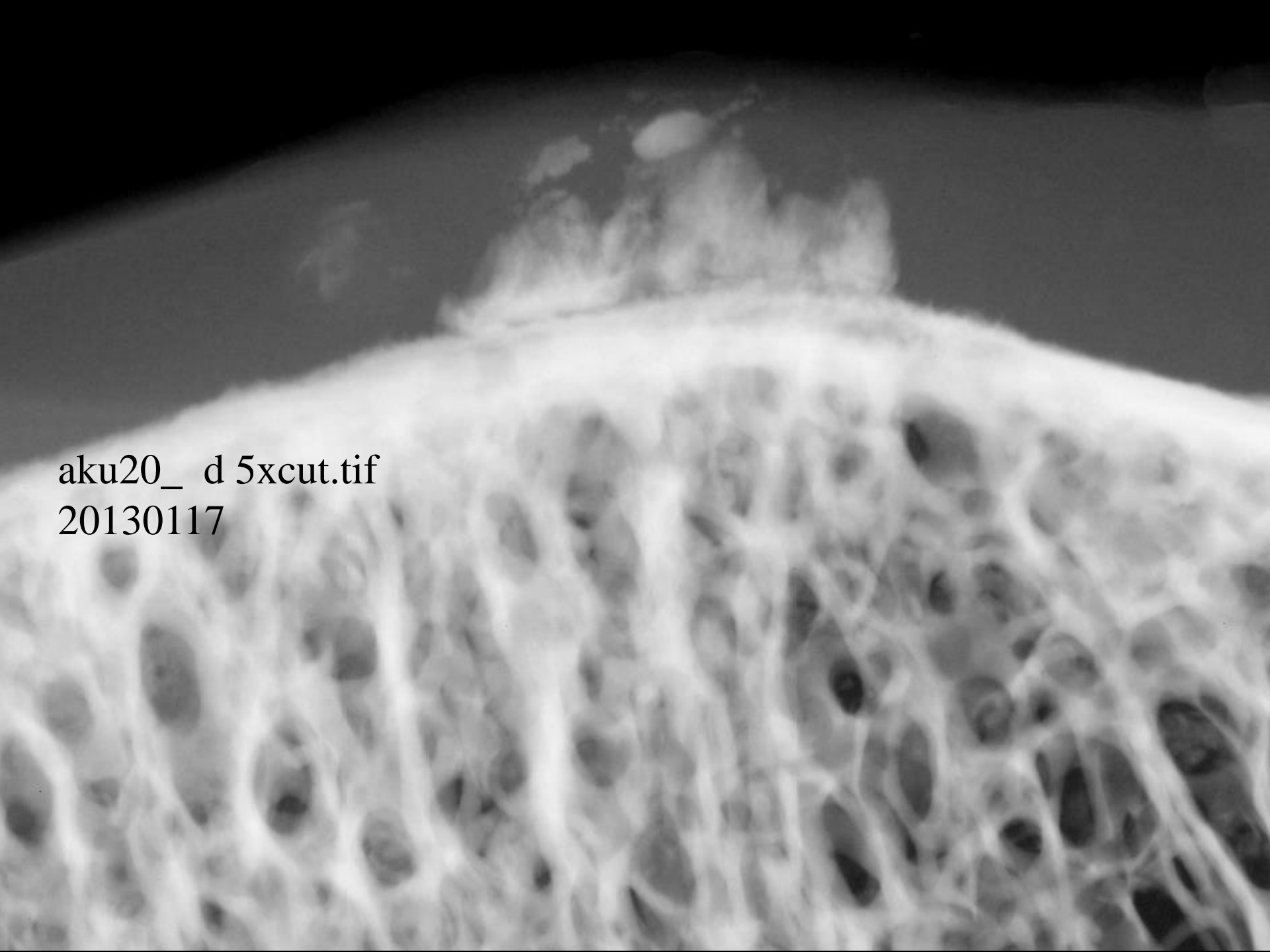




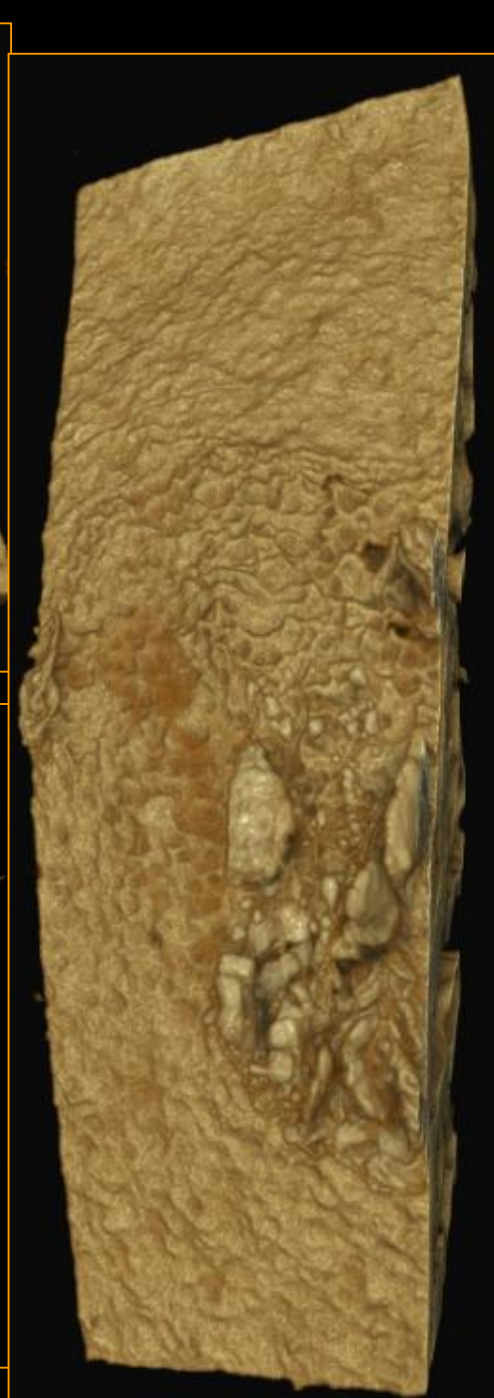
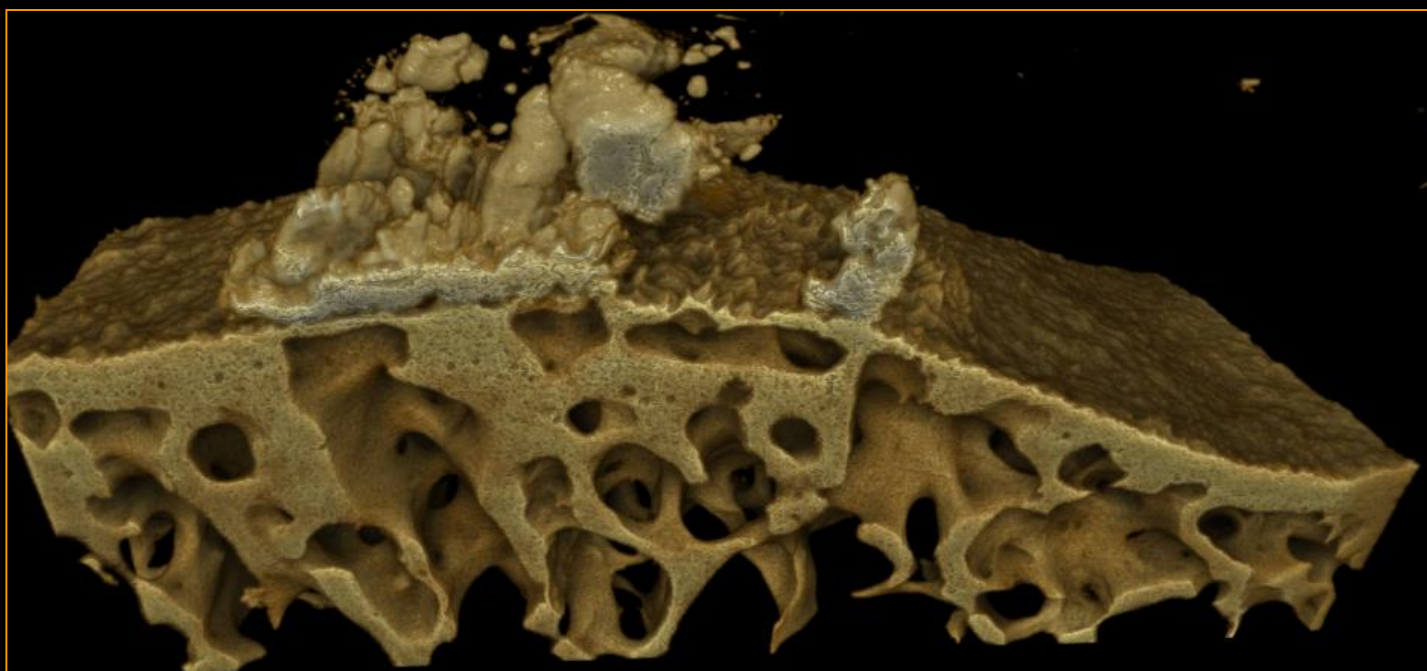
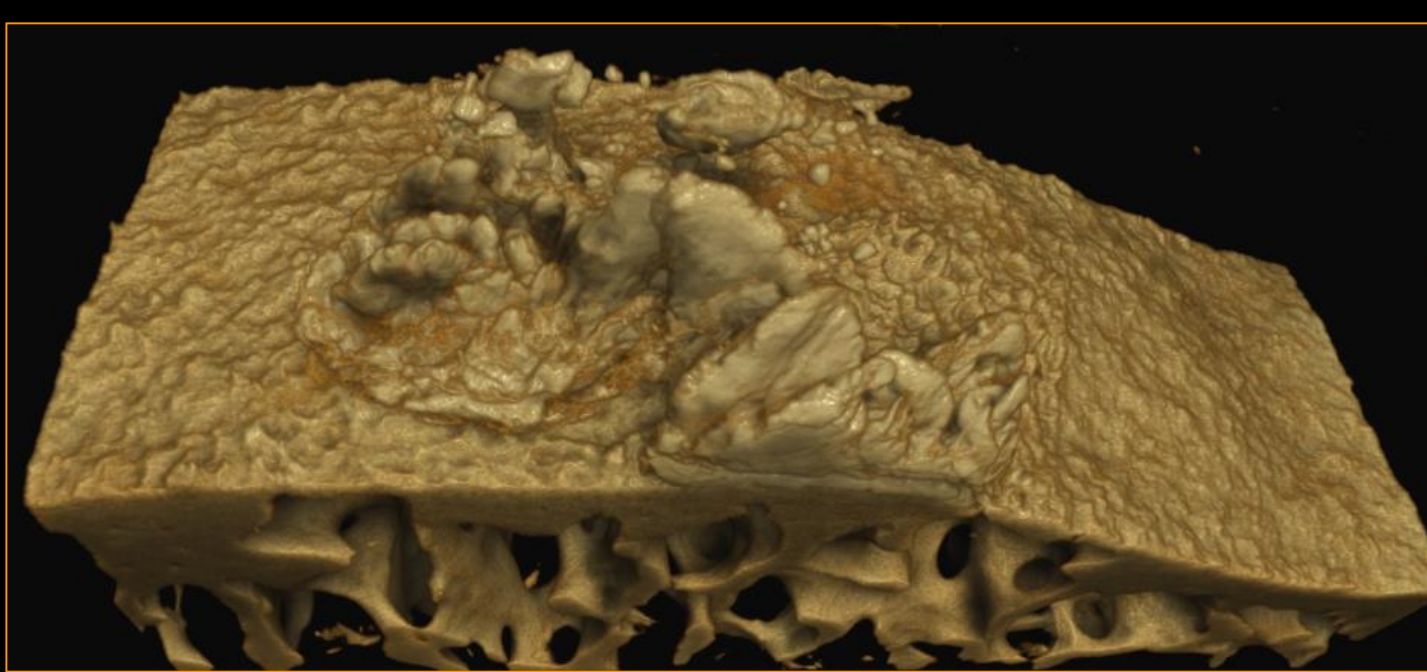


aku20_d 2x.tif
20130117



A black and white micrograph showing a cross-section of a tissue. The lower portion of the image displays a dense, interconnected network of cells, likely representing a cellular structure such as a neural network or a complex epithelial layer. The cells are arranged in a somewhat regular, grid-like pattern with visible nuclei and cytoplasm. Above this cellular layer, there is a distinct, lighter-colored band, possibly representing a basement membrane or a layer of connective tissue. The uppermost part of the image is dark and indistinct, suggesting the presence of other tissue layers or the edge of the specimen.

aku20_ d 5xcut.tif
20130117



100 μm

H

Height = 3.728 mm

Pixel Size = 4.654 μm

Mag = 23 X

WD = 10.0 mm

Stage at X = 39.110 mm

Stage at Y = 59.729 mm

Stage at Z = 27.031 mm

Stage at R = 357.6 °

Stage at T = 0.0 °

Compuc. Mode = Off

Scan Rotation = 0.0 °

Signal A = NTS BSD

EH = 20.00 kV

IProbe = 1.0 nA

Fill 1 = 2.310 A

292.30 Hours

OptiBeam = Normal

49 Pa

3 Mar 2013

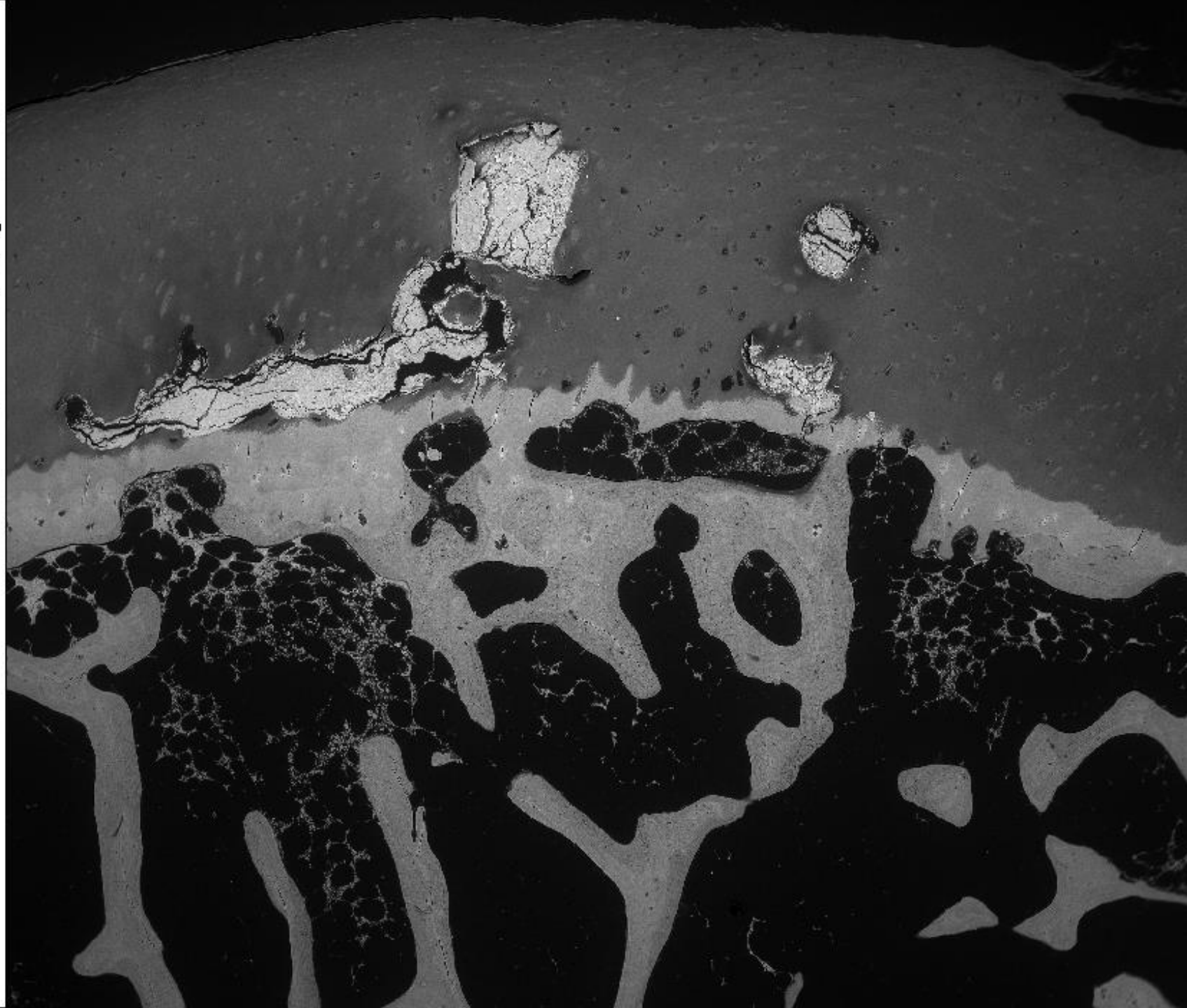
13:05:14

1.5 Mins

Scan Speed = 8

N = 1

aku20Dd_116.tif



100 μm



Height = 1.585 mm

Pixel Size = 2.063 μm

Mag = 54 X

WD = 10.0 mm

Stage at X = 40.026 mm

Stage at Y = 59.918 mm

Stage at Z = 27.631 mm

Stage at R = 357.6 $^\circ$

Stage at T = 0.0 $^\circ$

Compuc. Mode = Off

Scan Rotation = 0.0 $^\circ$

Signal A = NTS BSD

EHT = 20.00 kV

I Probe = 1.0 nA

Flt I = 2.319 A

297.08 Hours

OptiBeam = Normal

49 Pa

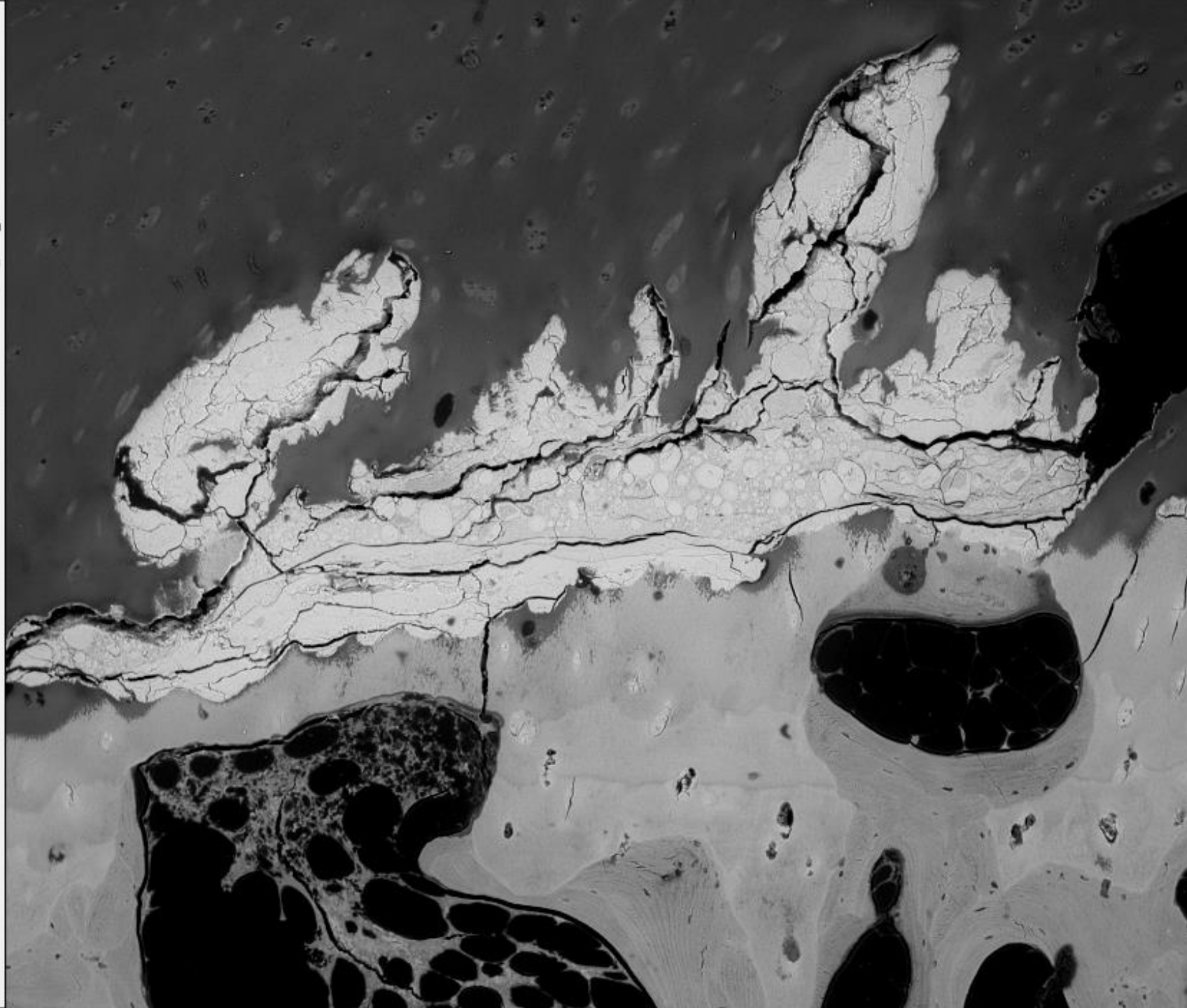
8 Mar 2013

17:10:10

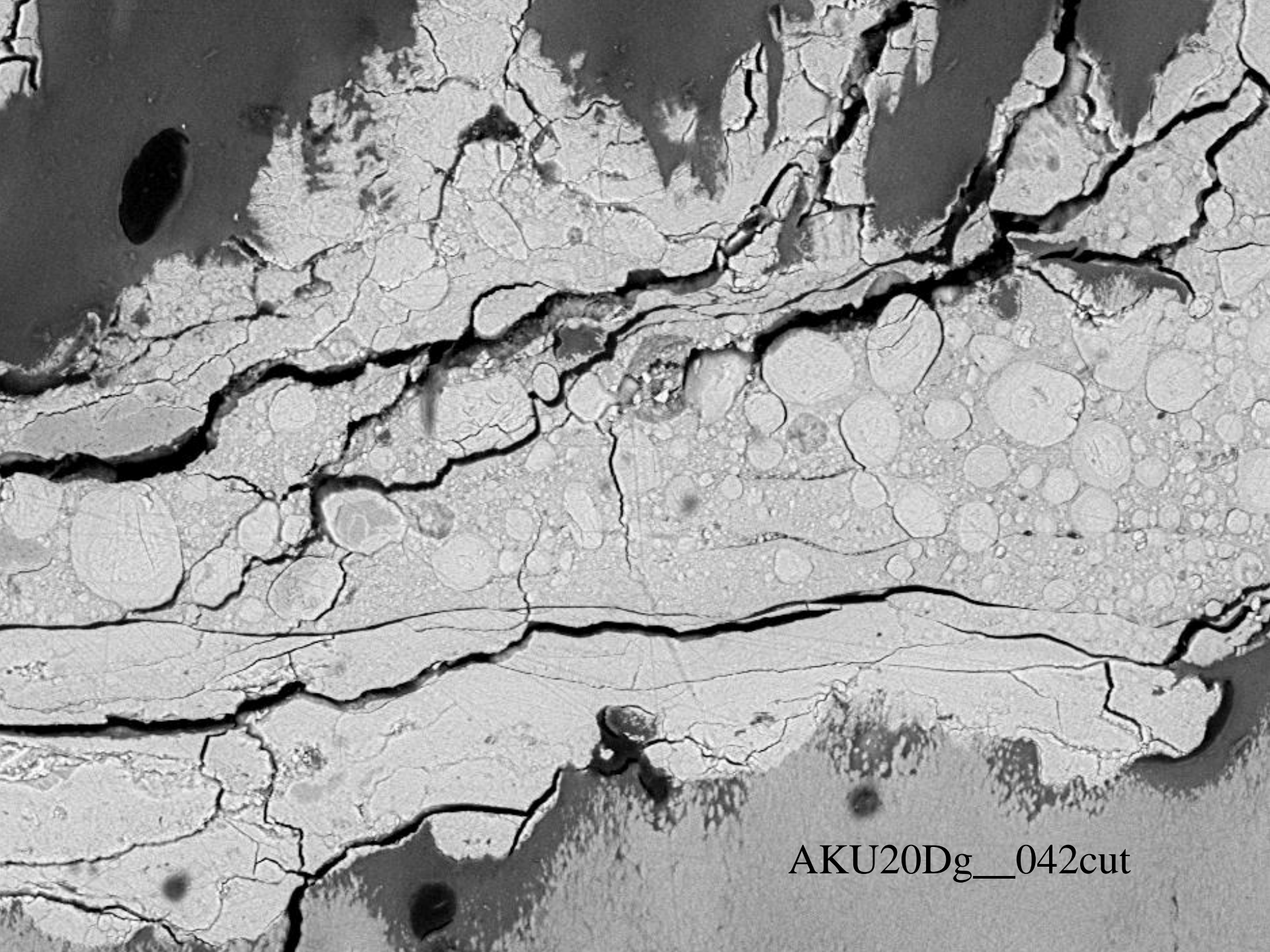
45.6 Secs

Scan Speed = 7

N = 1



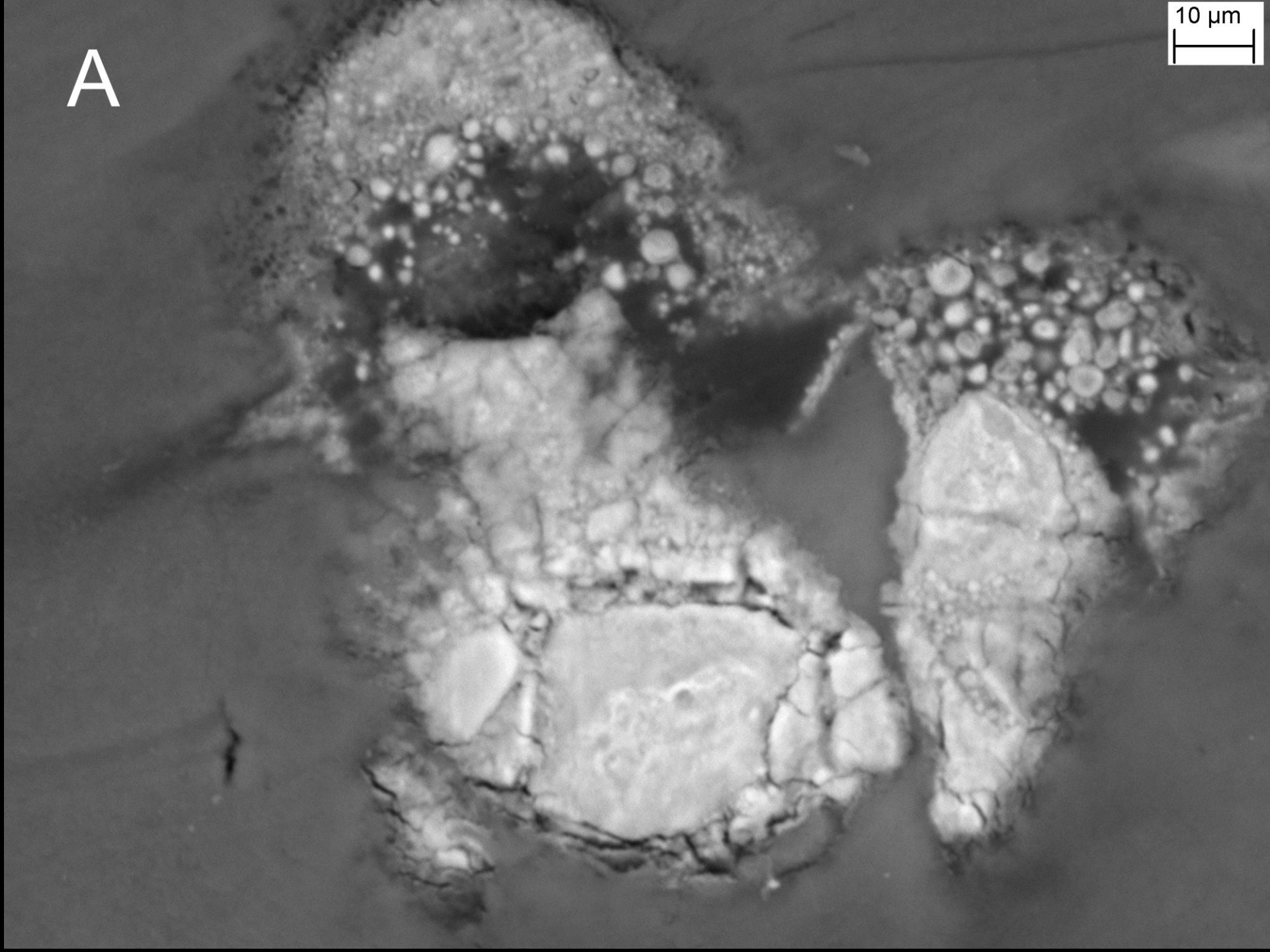
akuaf_040.tif



AKU20Dg__042cut

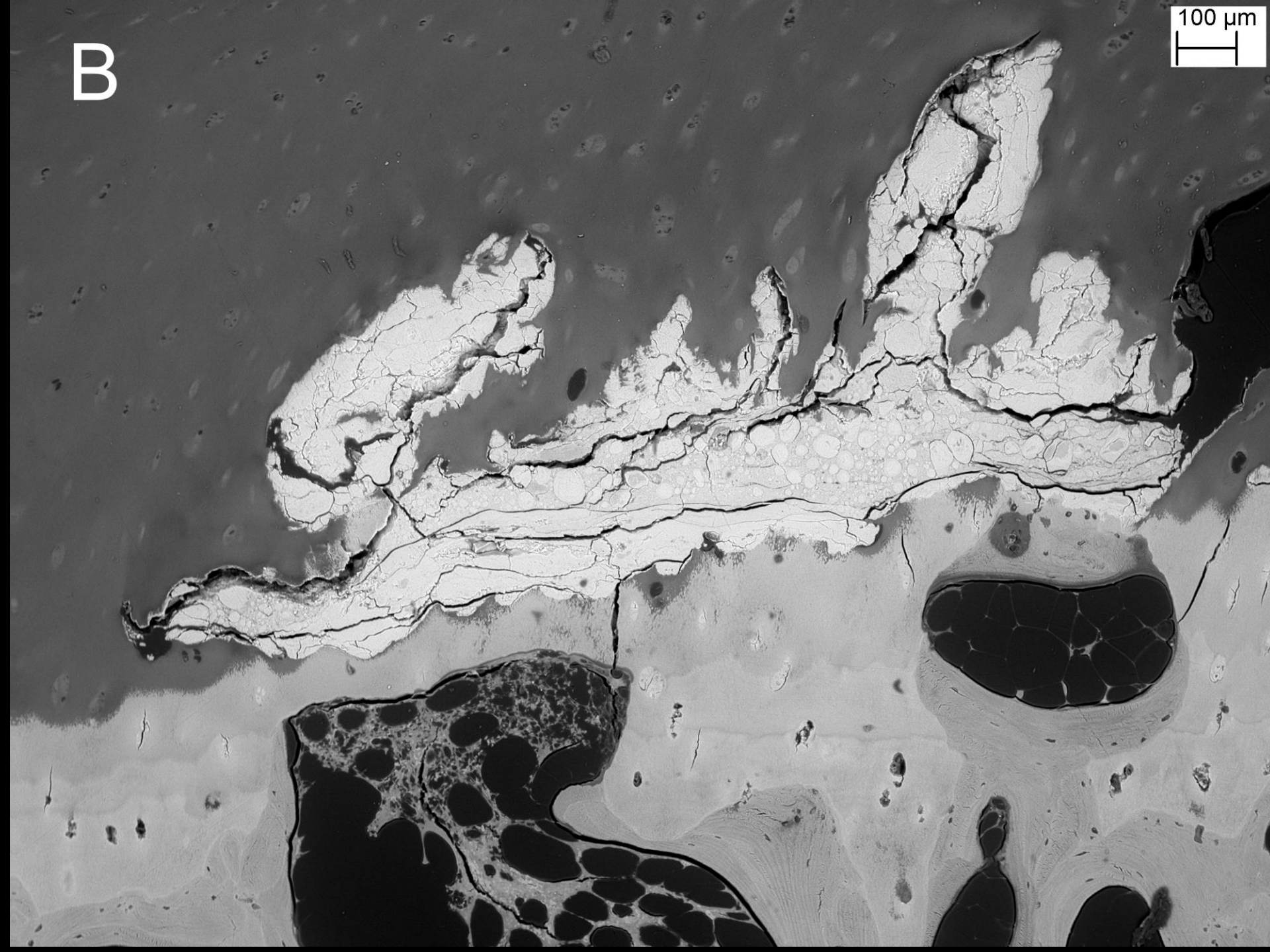
A

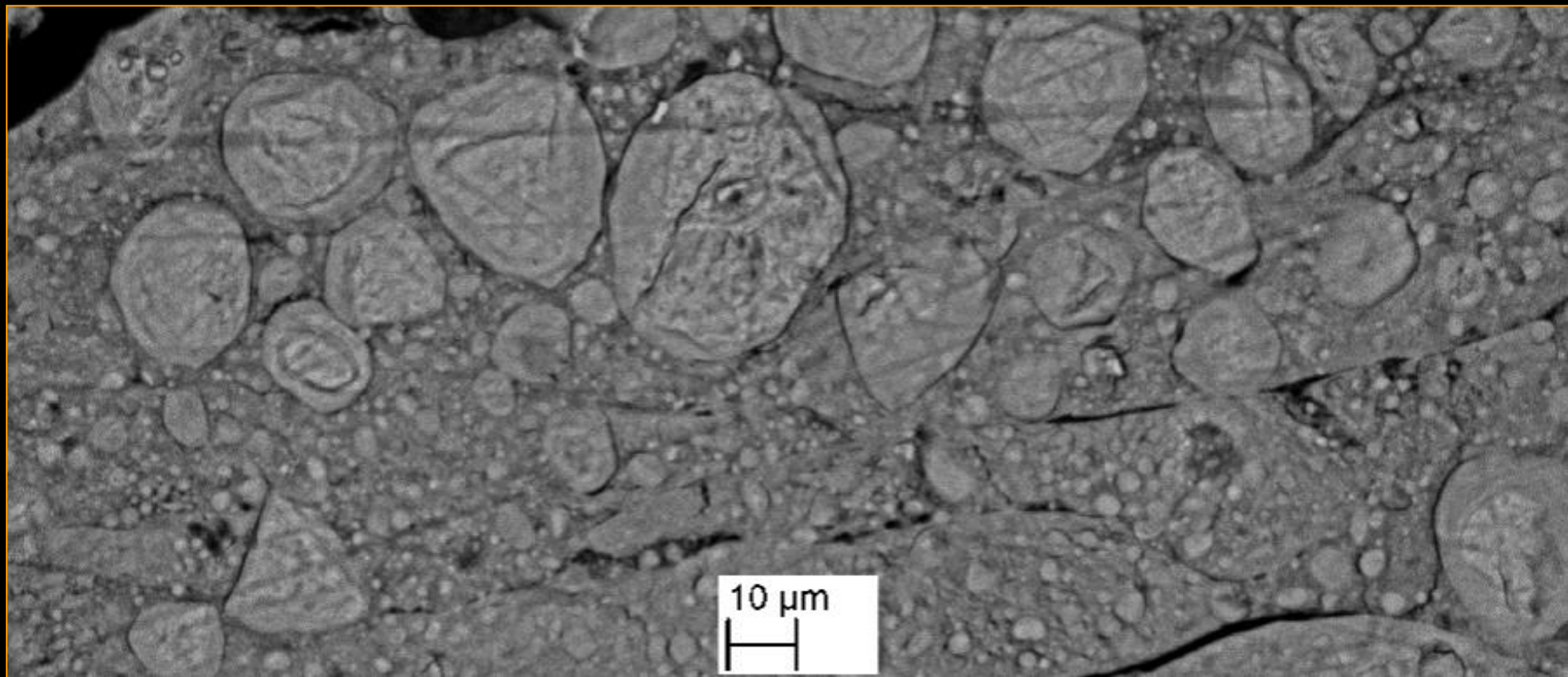
10 μm



B

100 μm





100 μ m



Height = 3.290 mm

Pixel Size = 4.284 μ m

Mag = 26 X

WD = 9.0 mm

Stage at X = 74.809 mm

Stage at Y = 15.364 mm

Stage at Z = 22.663 mm

Stage at R = 0.0 $^{\circ}$

Stage at T = 0.1 $^{\circ}$

Compuc. Mode = Off

Scan Rotation = 69.7 $^{\circ}$

Signal A = NTS BSD

EHT = 20.00 kV

I Probe = 741 pA

Fill I = 2.532 A

85.71 Hours

OptiBeam = Normal

49 Pa

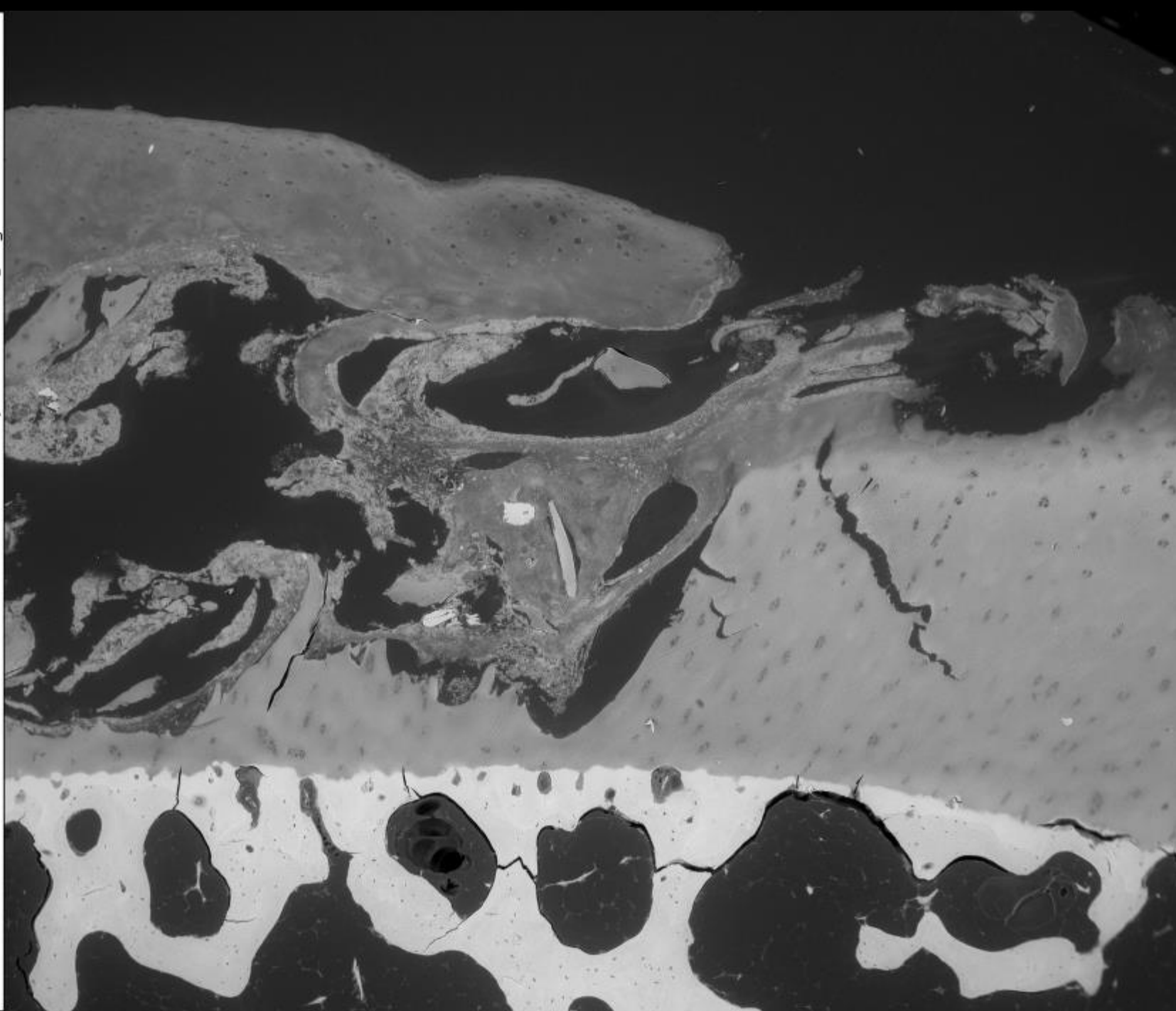
23 Sep 2013

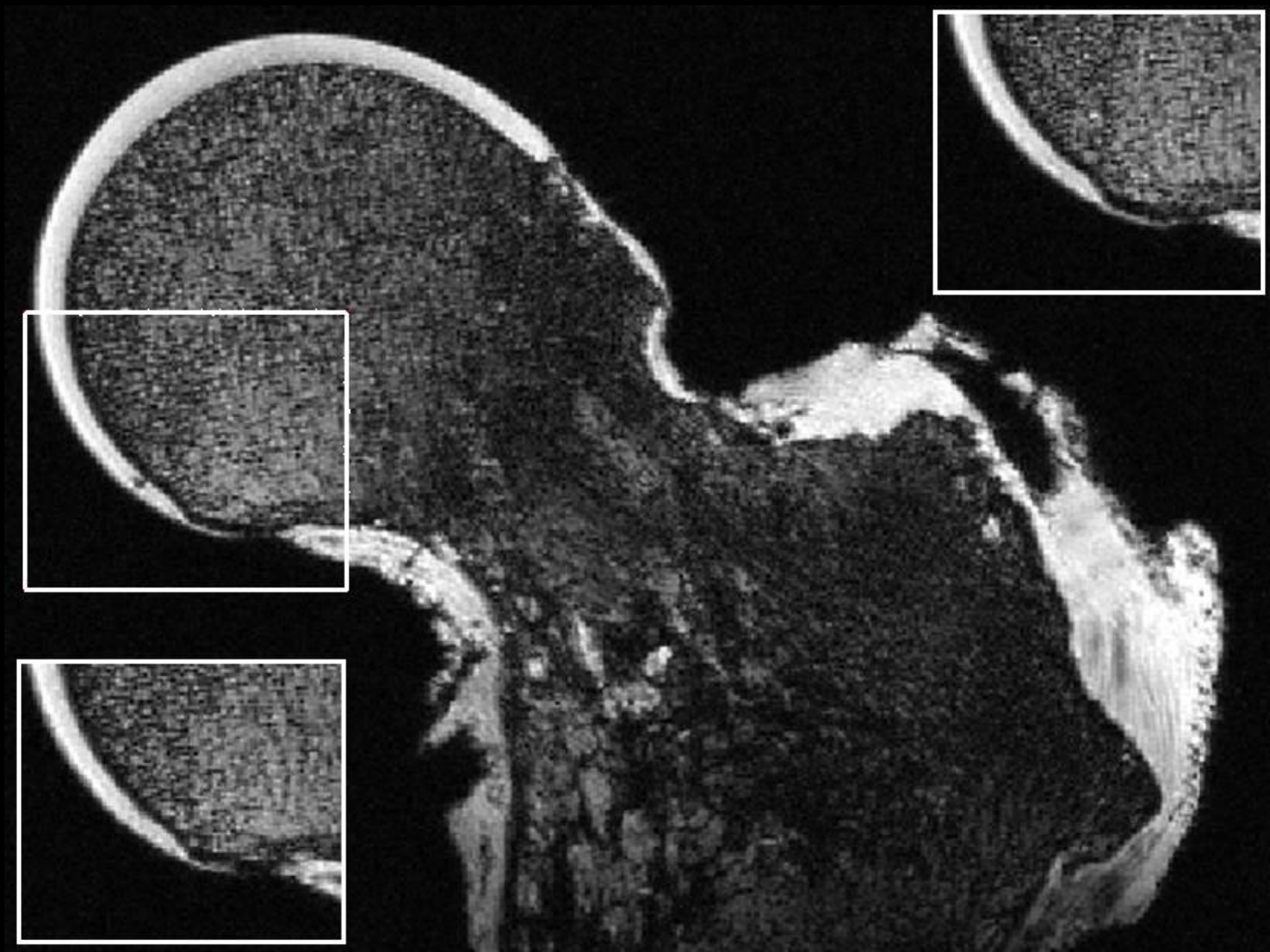
16:30:04

40.4 Secs

Scan Speed = 8

N = 1





100 μm



Stage at Z = 10.195 mm

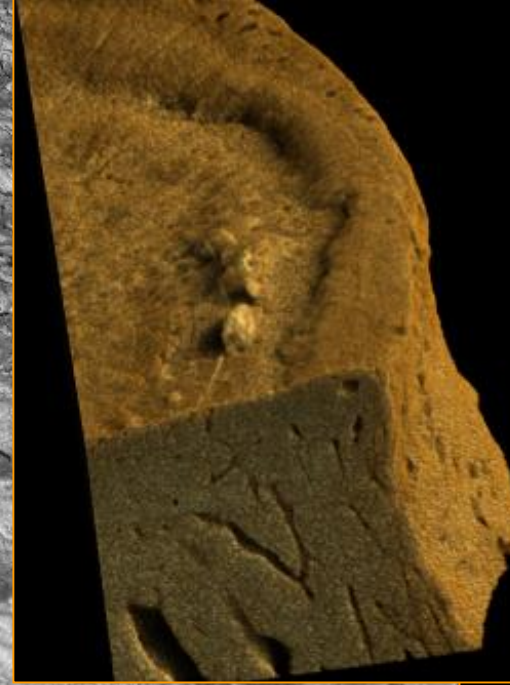
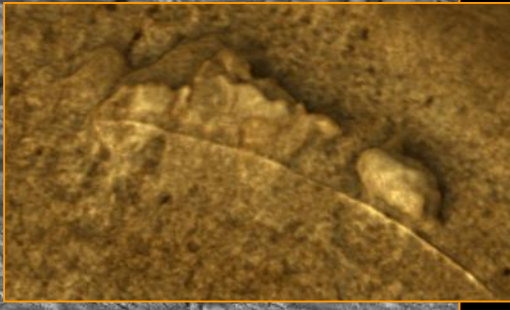
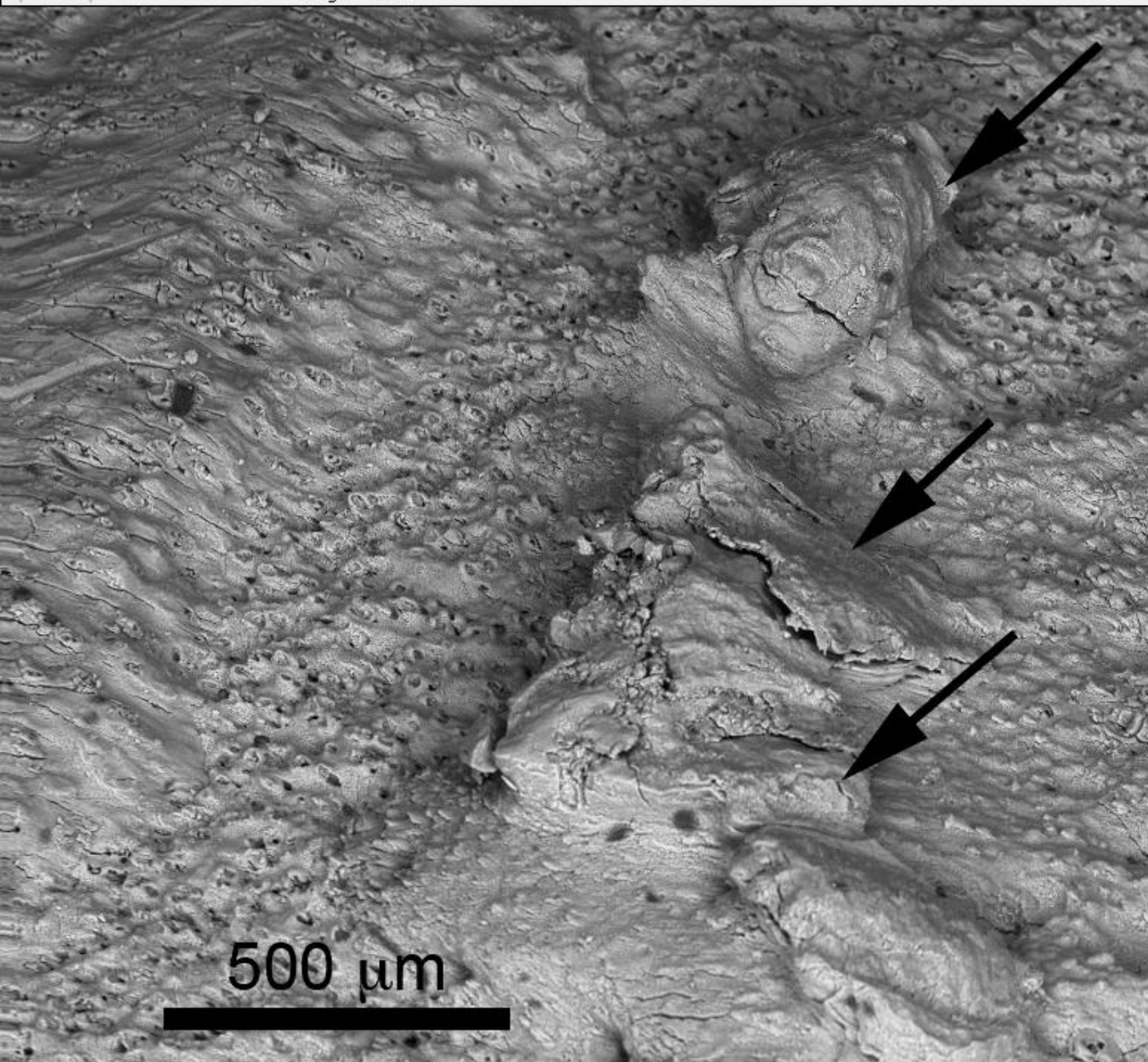
Stage at T = 11.0 °

EHT = 20.00 kV

Signal A = CZ BSD

WD = 14.0 mm

Mag = 140 X



0 μm

Stage at Z = 13.959 mm
WD = 14.0 mm
Mag = 100 X

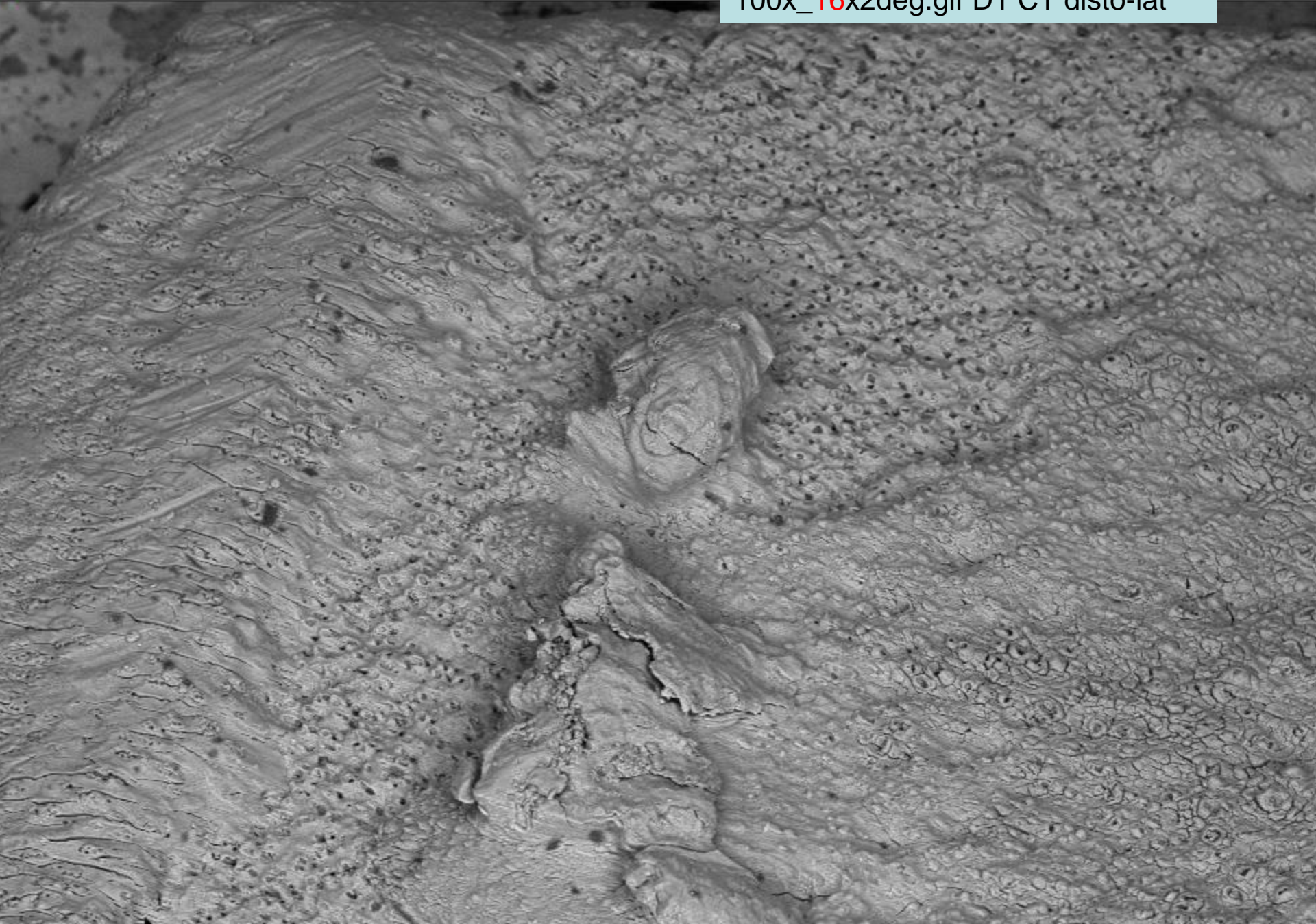
Stage at T = 2.0 °

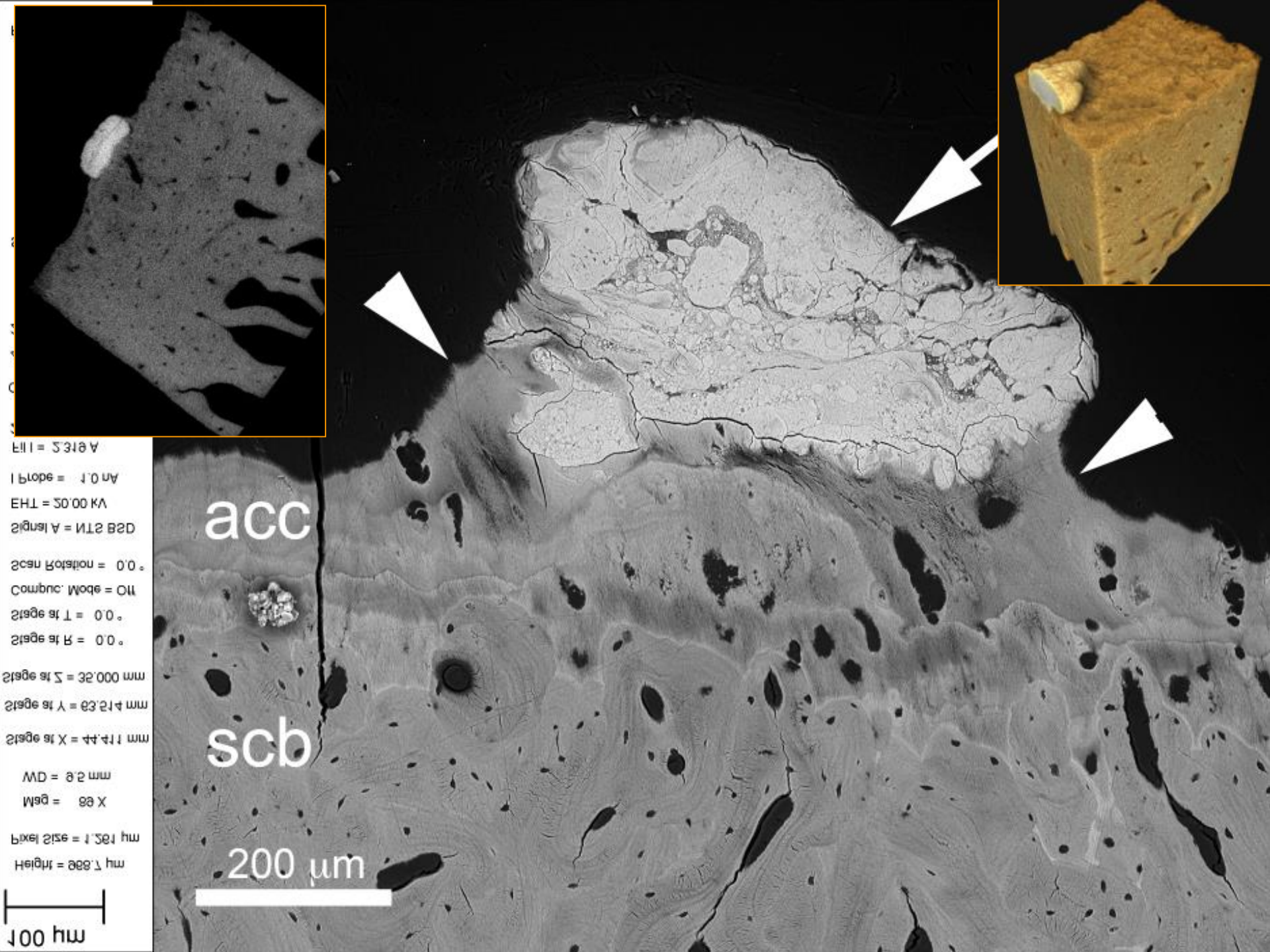
EHT = 20.00 kV
Signal A = CZ BSD

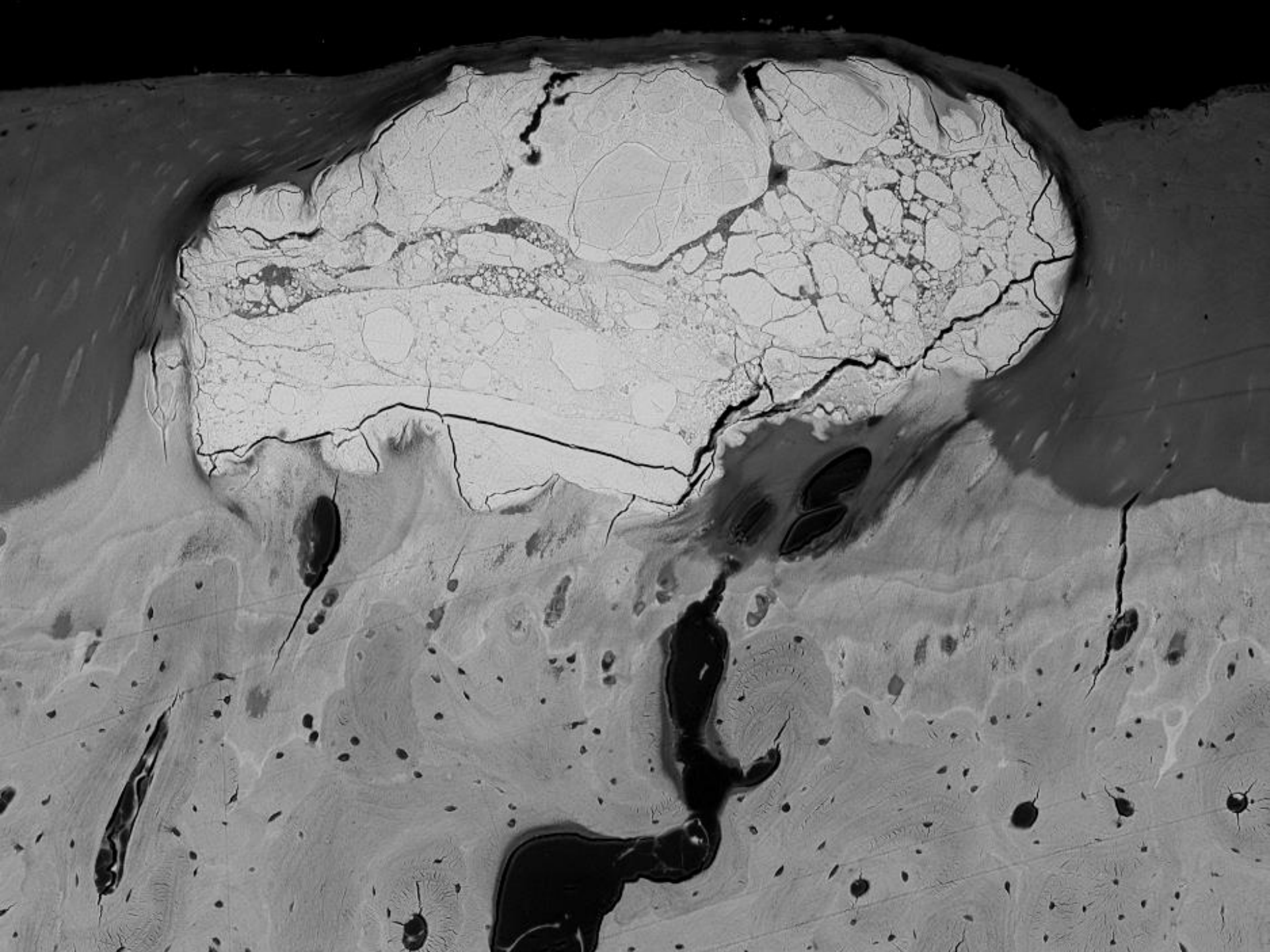
Chamber = 29 Pa

Date : 5 Sep 201
Time : 10:59:12

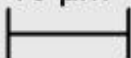
100x_16x2deg.gif D1 CT disto-lat







10 μm



Height = 119.8 μm

Pixel Size = 155.9 nm

Mag = 716 X

WD = 9.5 mm

Stage at X = 45.816 mm

Stage at Y = 66.939 mm

Stage at Z = 0.000 mm

Stage at R = 0.0 $^{\circ}$

Stage at T = 0.0 $^{\circ}$

Compuc. Mode = Off

Scan Rotation = 0.0 $^{\circ}$

Signal A = NTS BSD

EHT = 20.00 kV

I Probe = 1.0 nA

Fil I = 2.319 A

287.61 Hours

OptiBeam = Normal

49 Pa

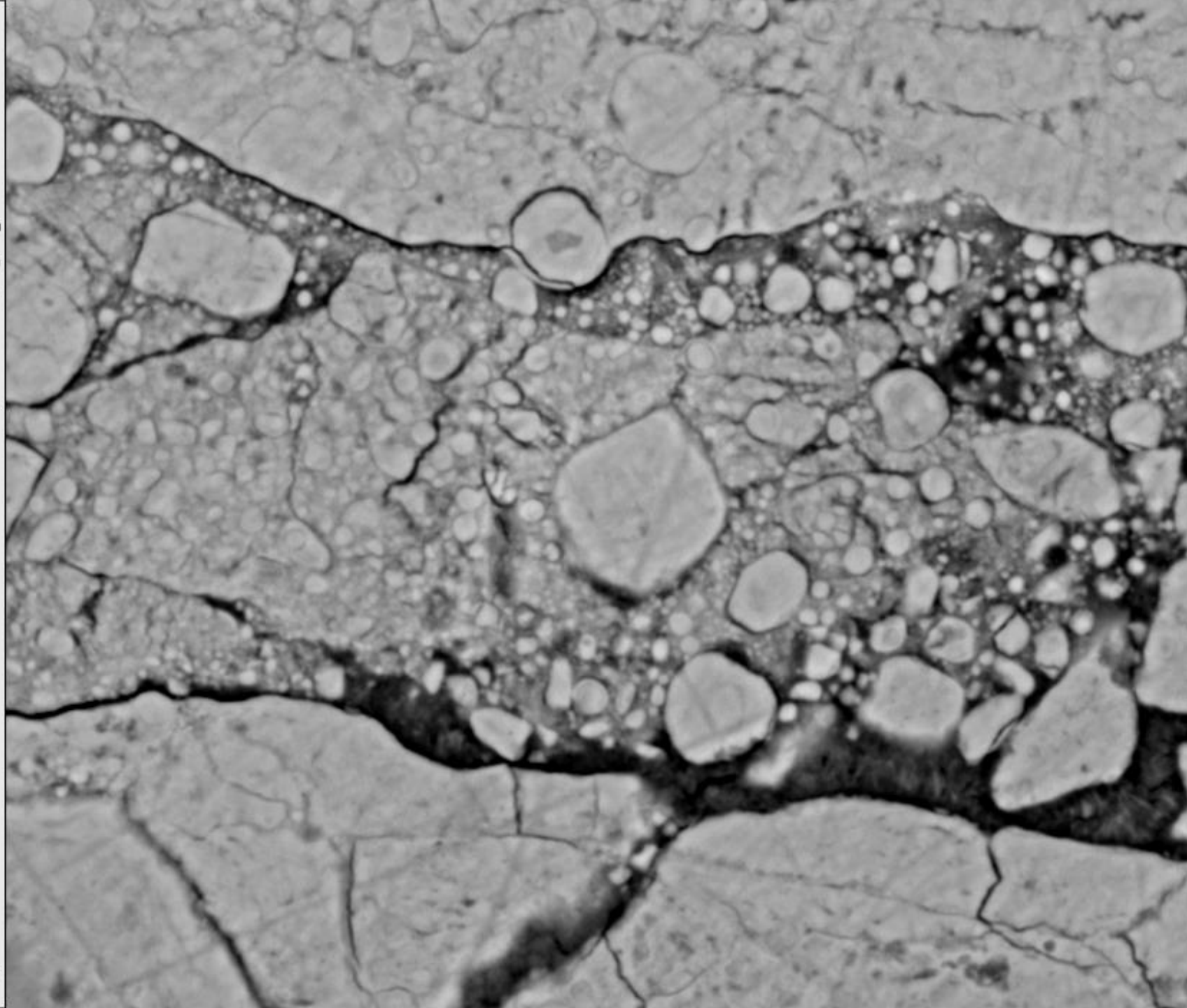
24 Feb 2013

14:52:19

45.6 Secs

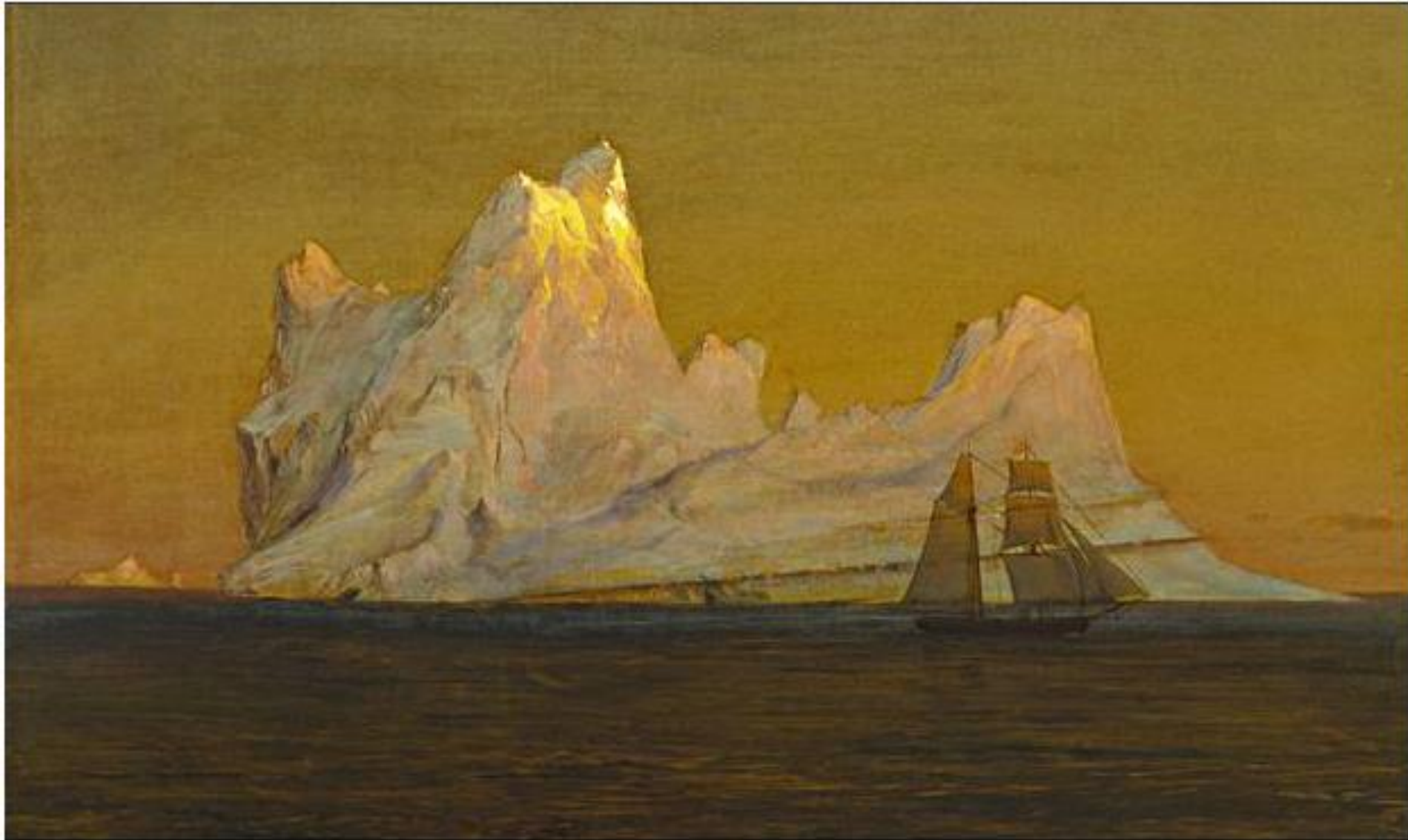
Scan Speed = 7

N = 1

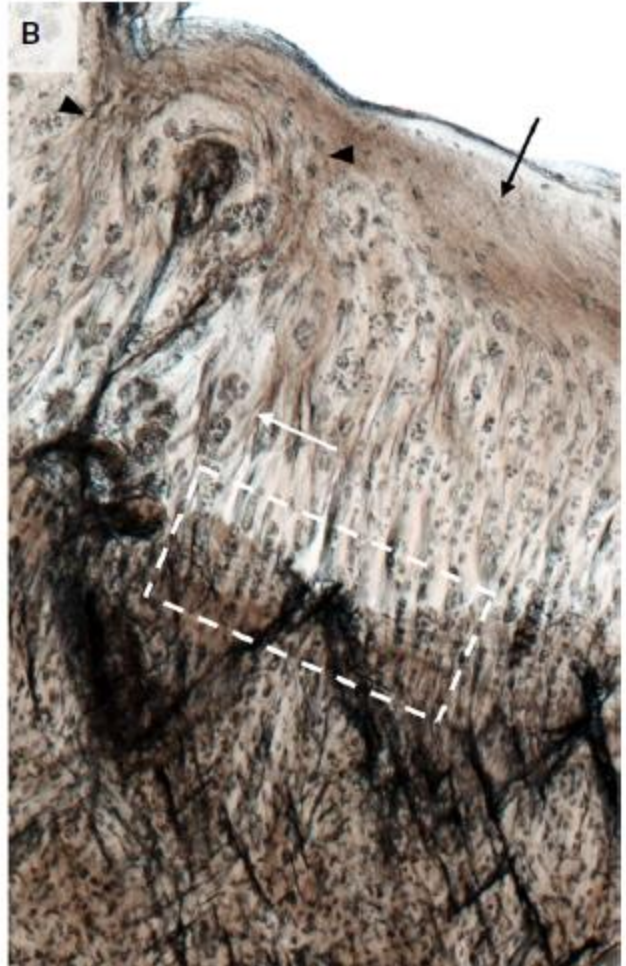
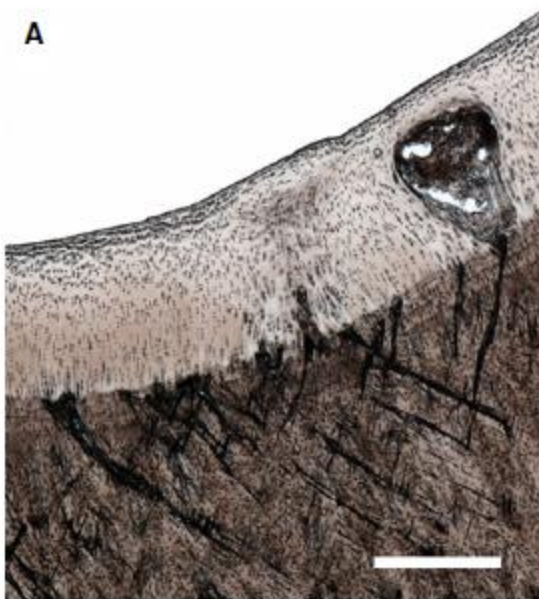


R1b2L_ammlii_918.tif

The tip of the iceberg?



Sailing by: The Iceberg, c.1875, was inspired by oil sketches Church had made in 1859



J. Anat. (2014)

doi: 10.1111/joa.12

Microstructural changes in cartilage and bone related to repetitive overloading in an equine athlete model

Fig. 5 Sean M. Turley,¹ Ashvin Thambyah,¹ Christopher M. Riggs,² Elwyn C. Firth³ and Neil D. Broom¹

QMUL: Mo Arora, Graham Davis, David Mills, Tomas Zikmund

Liverpool: Jim Gallagher, Ranga Lakshminarayan, Nathan Jeffery, Jonathan Jarvis, Jane Dillon, Peter Wilson

