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Hole U1580a

Created by Maryalice Yakutchik in coordination
with the Expedition 392 Science Party /
International Ocean Discovery Program

Illustrated by Marlo Garnsworthy

3.9.2.haiku—a literary porthole into deep ocean drilling—strings together the voices of dozens of scientists who travelled from countries all over the world to live in close quarters and work together for eight weeks aboard the JOIDES Resolution, a legendary research ship. The poem describes, in sequence, 68 sediment cores spanning more than 70 million years and constituting the whole of hole (U1580A).

3.9.2.haiku captures exploration and discovery as it took place hundreds of kilometers off the coast of Cape Town, in the remote reaches of the Indian Ocean, far from the public eye. It's an invitation for readers to engage with cores from the privileged point-of-view of researchers who were the first to see, smell, and touch material from deep under the ocean floor; who, after watching the cores be split open, spent hours analyzing each centimeter of mud and rock.

Haiku is an especially relevant way to package core descriptions from the Cretaceous period, which was the focus of IODP Expedition 392 to the Agulhas Plateau. An ancient poetic form consisting of 17 syllables in three lines (5-7-5), haiku compactly and powerfully captures moments of time . . . moments that, on the surface, may appear unremarkable but resonate with the deep truths. . . truths that emerge from paying close attention to the natural world.

The individual haiku are gems that reveal anticipation, frustration, awe, excitement, and wonder. Strung together, they uncover a trove of insights that span millennia. By allowing us to see ourselves as tiny points on a long ecological and geological spectrum, the collection reveals how fortunate we are to be alive at this moment, on this planet.

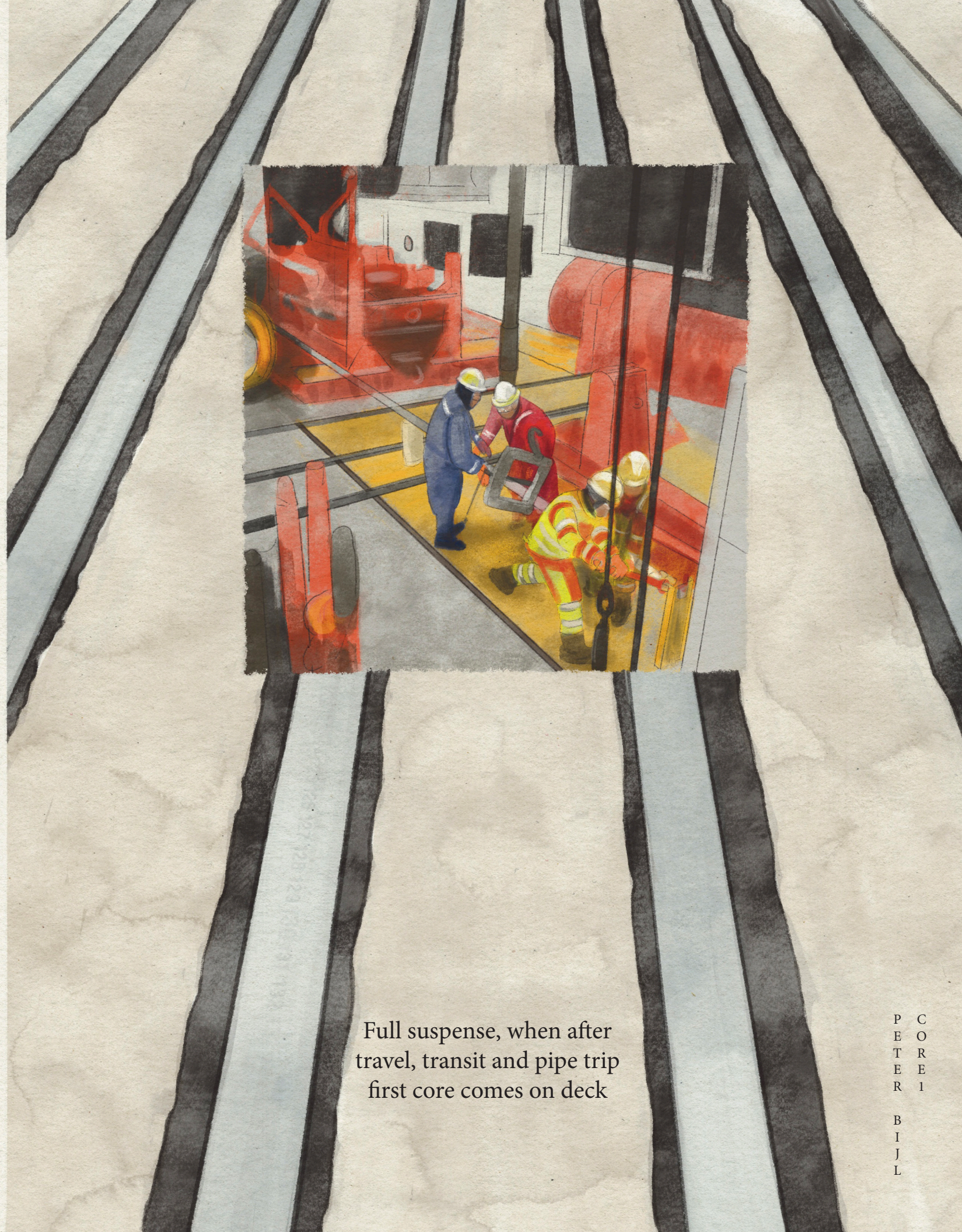
~ Maryalice Yakutchik, Onboard Outreach Officer, Expedition 392/Agulhas Plateau



When the speaker barks,
we all rush to the catwalk—
“Core is on the floor!”



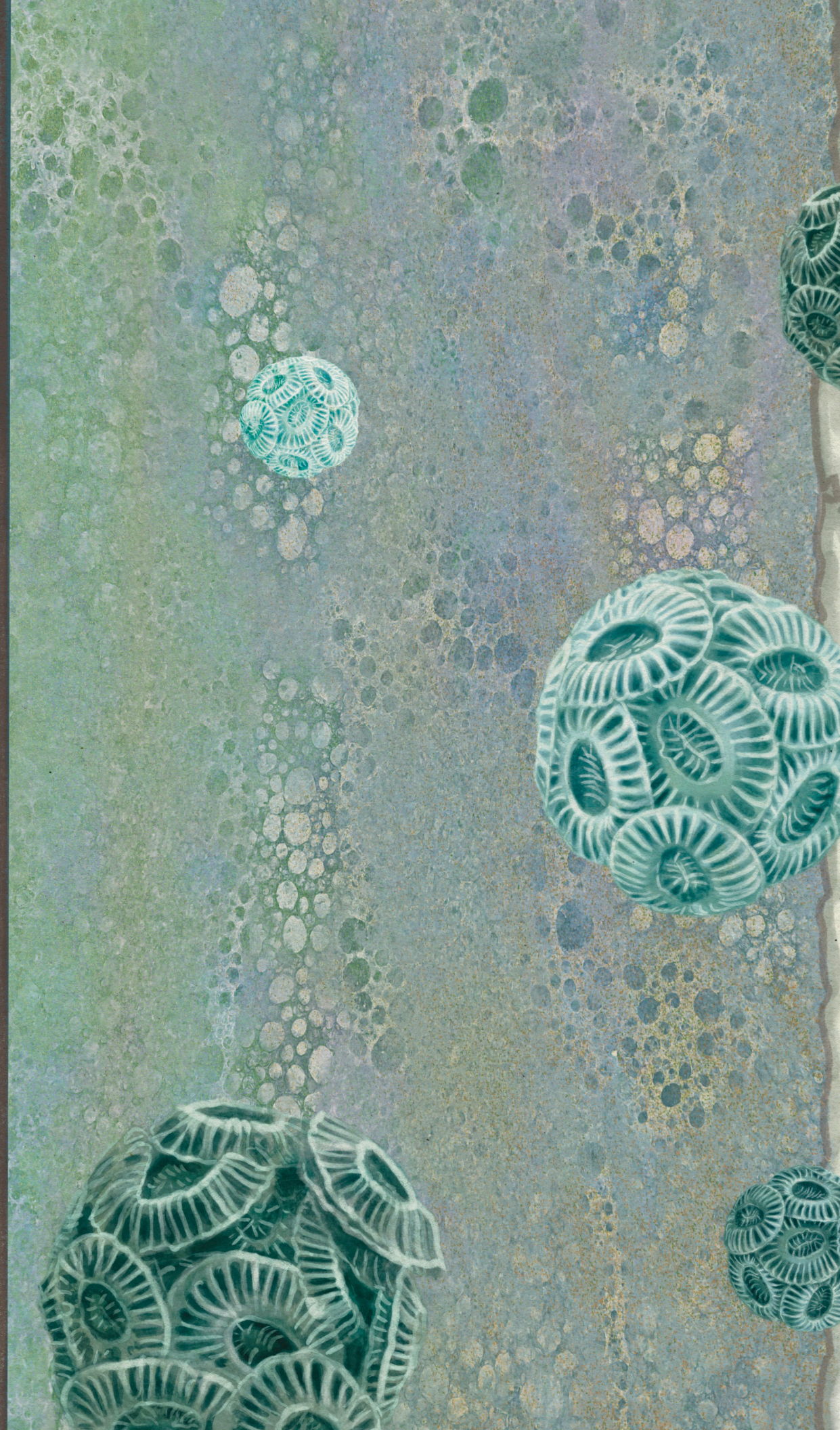
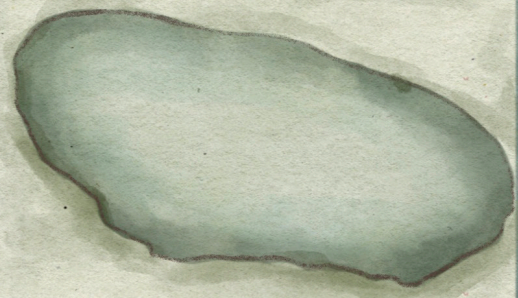
A hole is a whole
book of time to be savored—
Past informs future.



Full suspense, when after
travel, transit and pipe trip
first core comes on deck



There once was a chert
from Agulhas; fell into
our core to fool us.



Soft and white like snow
nannofossils, more than stars
in a galaxy

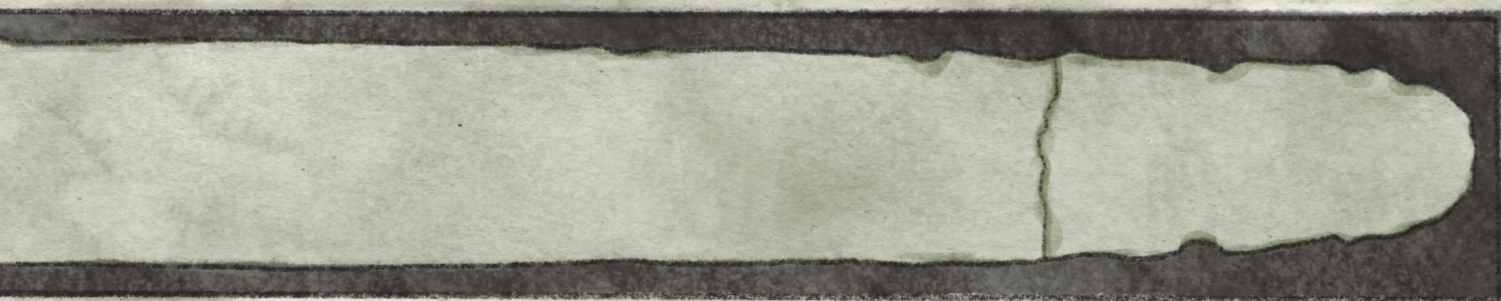
Whitish-gray muck mud
deemed "unremarkable"—
keeps silent secrets



Clear and yet a haze
A fog bank rolls over me
Shadows sediments



White chalk green clay chalk
warm greenhouse Earth history
code to the future



Tipped with a spear point
But eventless sediment
The form an idea

Well! this is core eight
still many more to drill
'til reaching basalt

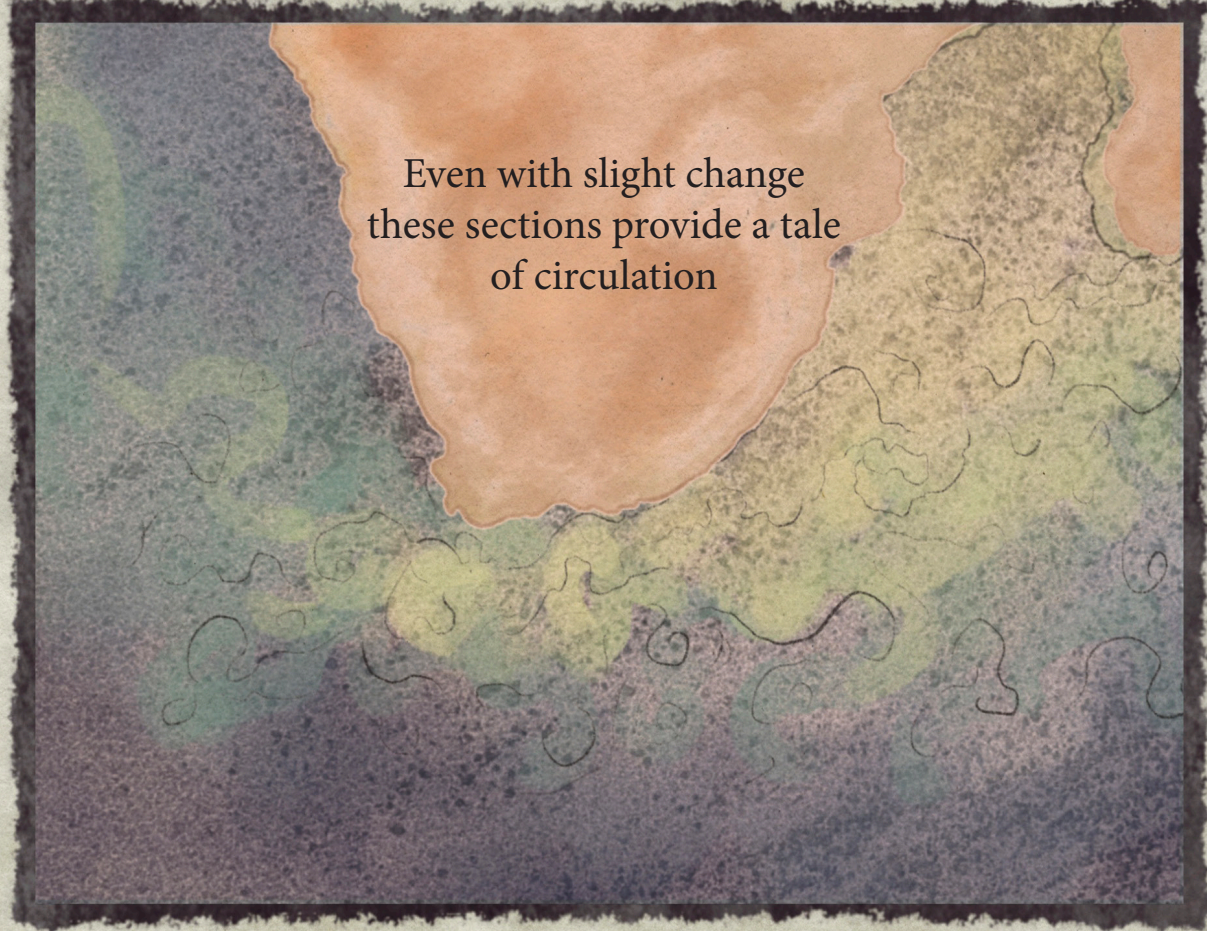
Tracks and trails preserved
over millions of years
tales of ancient bugs



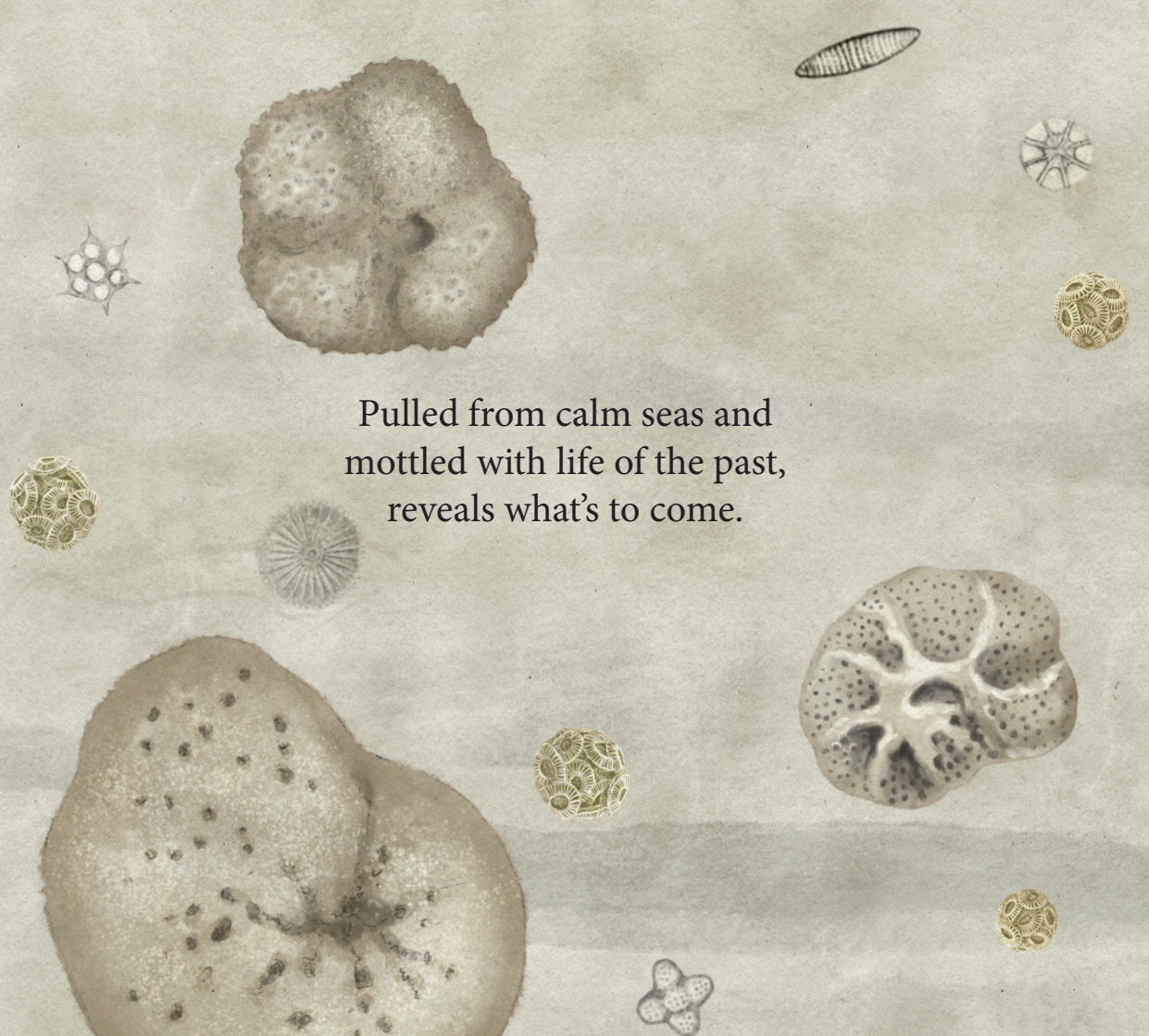
Fifty million
A rosette discoaster
Chosen for age



Core on deck they said
Did the band get together?
Diatoms aren't us



Even with slight change
these sections provide a tale
of circulation



Pulled from calm seas and
mottled with life of the past,
reveals what's to come.

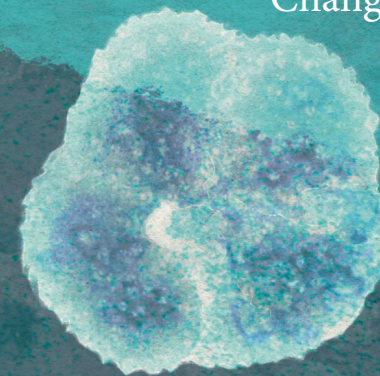
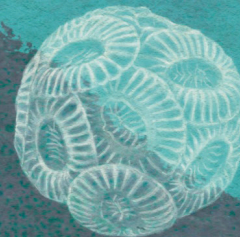
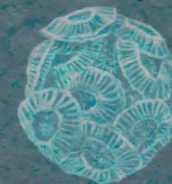
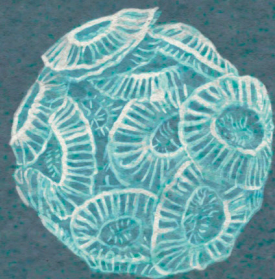
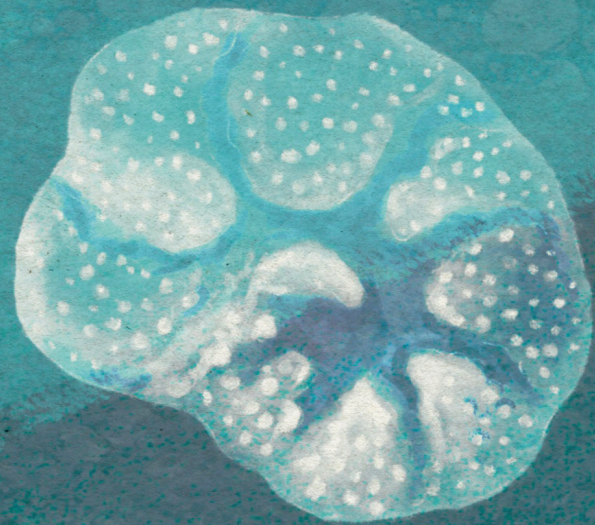
A new wind blowing
Carries fine magnetic dust
Origin unknown



Moisture, density, color
Something missing in my data log—
Probably time?

C
L
E
X
A
N
D
E
R
1
6
M
I
N
A
K
O
V

Reading rock records
Could nature have rewritten
the first manuscript?



C
J
A
M
E
S
1
7
M
C
M
A
N
U
S

Nature's signatures
white shells of the sea remain
remnants of life past

Water in your pores?
Can I squeeze you just a bit?
Change the world we know

J
O
H
N
N
A
2
0
S
U
H
O
N
O
N

C
R
A
L
E
I
G
H
1
8
D
A
R
N
E
L
L

Dark grey bands break up
the sovereign monochrome
Broken up pieces

C
D
E
B
A
D
R
I
T
A
1
9
J
A
N
A

We know half the tale
the other is lost to time
never recovered

Life continues on,
A new world order rises.
Nothing is the same.

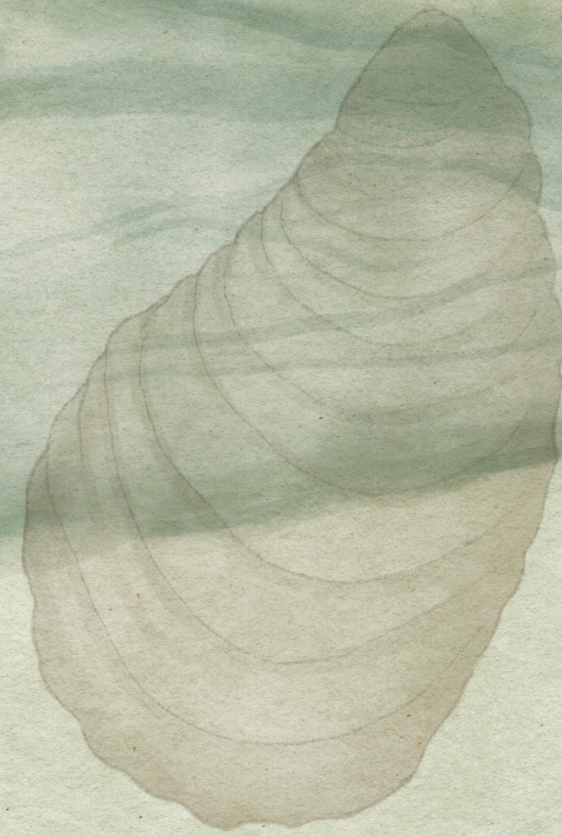
KaTy's Boundary
Subtle, but ever present
She yells: "NO SAMPLES!"



Happy marine life
Swimming. Floating. Unaware,
Of what's soon to come.

Planktonic bliss
Destined for calamity
Agulhas chalk seas

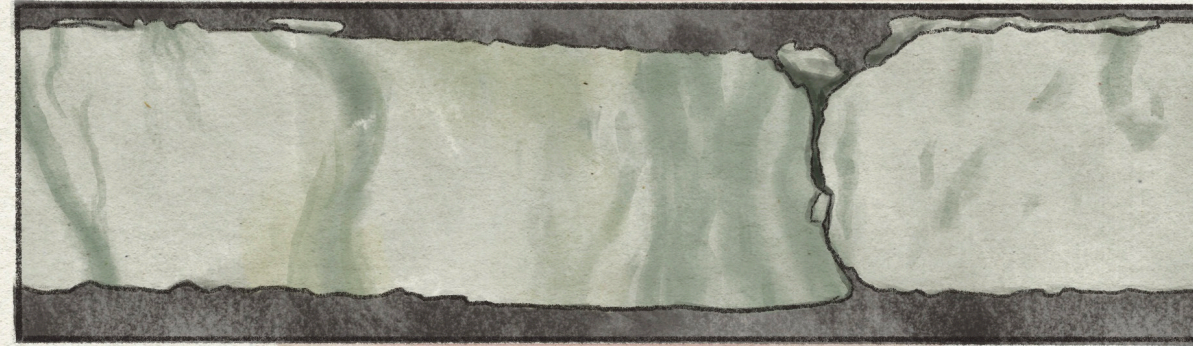
At 6 I was on deck
seven cycles I reveal
Warm or cold, who knows



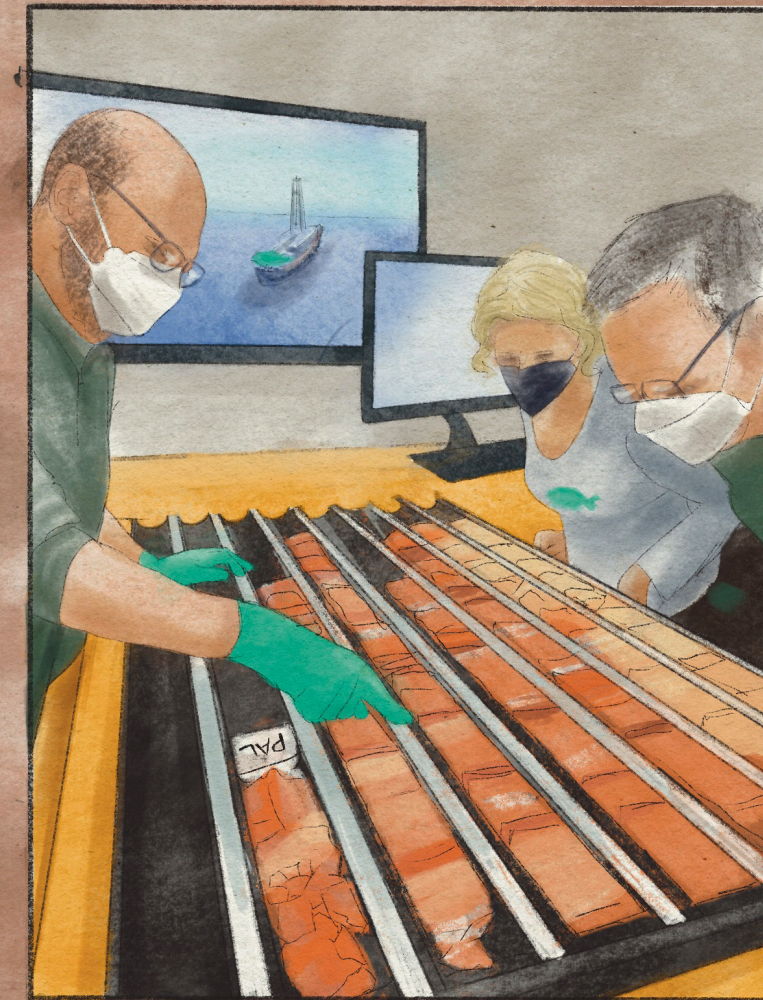
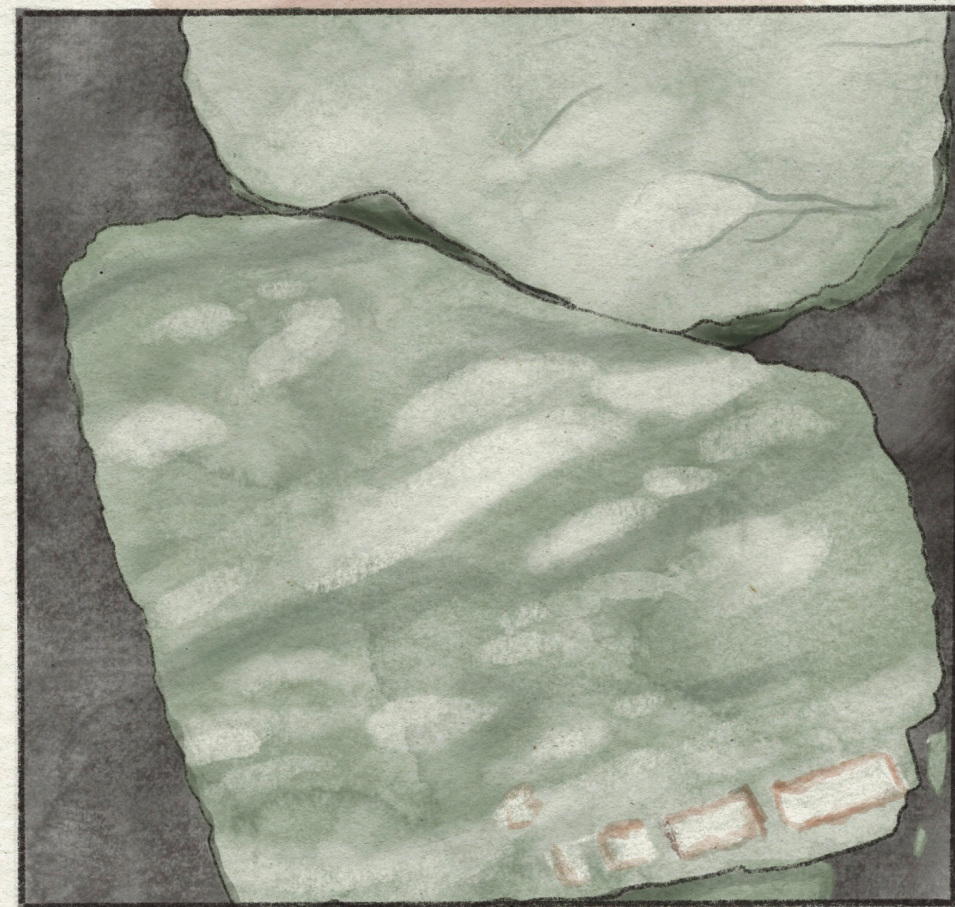
Filter-feeding this
screen inoceramid ring
bearing my era



What color is this?
seems white, and it reverses
however poorly



White and grey segments
the look of marble counters
elevated fate

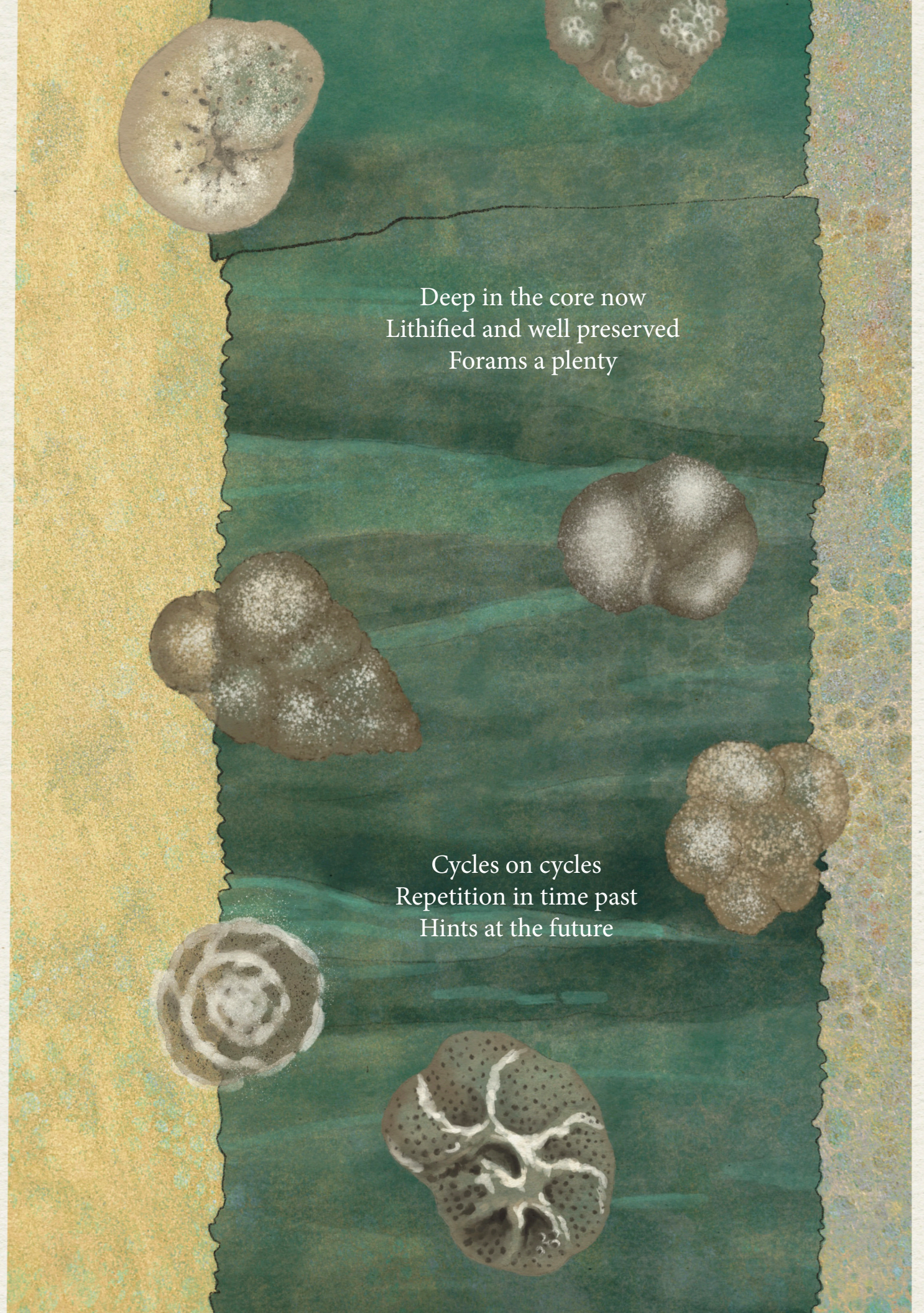


Red and white rhythms
telling secrets in cycles—
an anchor dropped.

Burrows and layers
Life history and changes--
The "green stuff" is near



Green to red to beige
paleo-environment
colors reflect change



Deep in the core now
Lithified and well preserved
Forams a plenty

Cycles on cycles
Repetition in time past
Hints at the future

C O D
O R Y
E S E
3 U
4 S
A
R
C
H
O
N
T
I
K
I
S

Turbated chalk
A little coccolith stands
for Cretaceous



Window to past world
shelly fossils suspended
in a blue-green sea

C S
O T
R E
E V
E
3 B
5 O
H
A
T
Y

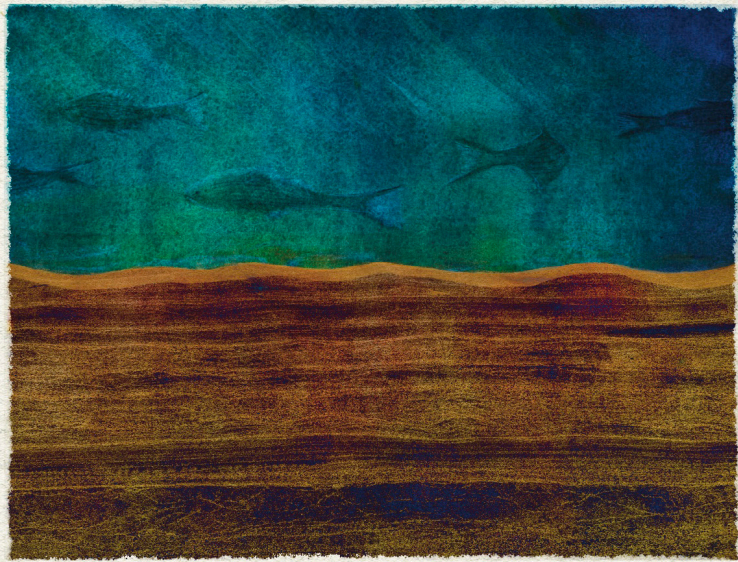


A dark sandy beach
beneath crumbling volcanoes
the tides never stop

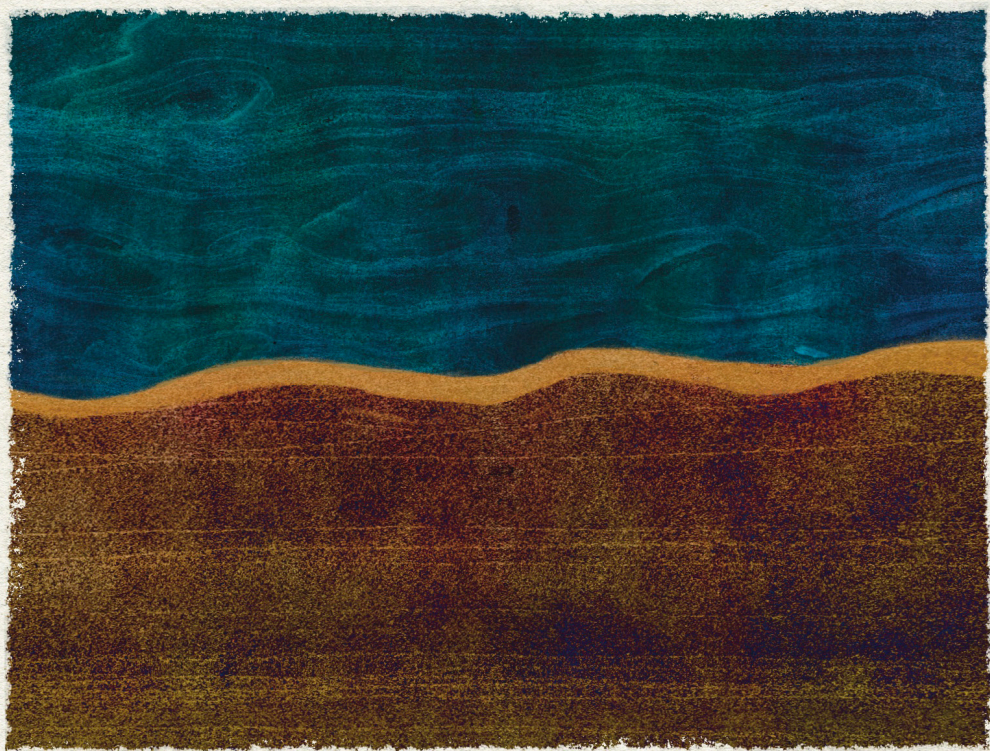
Into the green clays
Elements flow from the sea
Reverse weathering

D O R
O N
A L
D
3
P
E
N
M
A
N

A C
L O
R
Y
S O
N
3
7
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Underwater tales
of slow rains, quick storms—told in
vivid shades of green

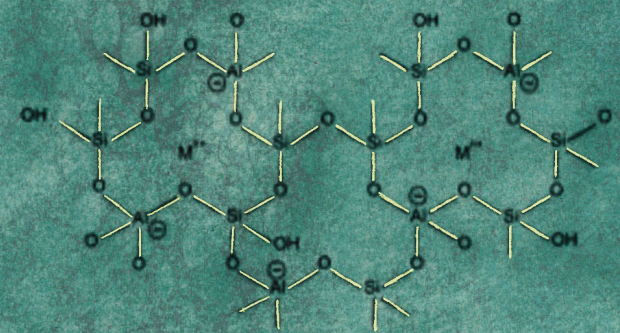


Millions of years old
the minerals here still change—
diagenesis



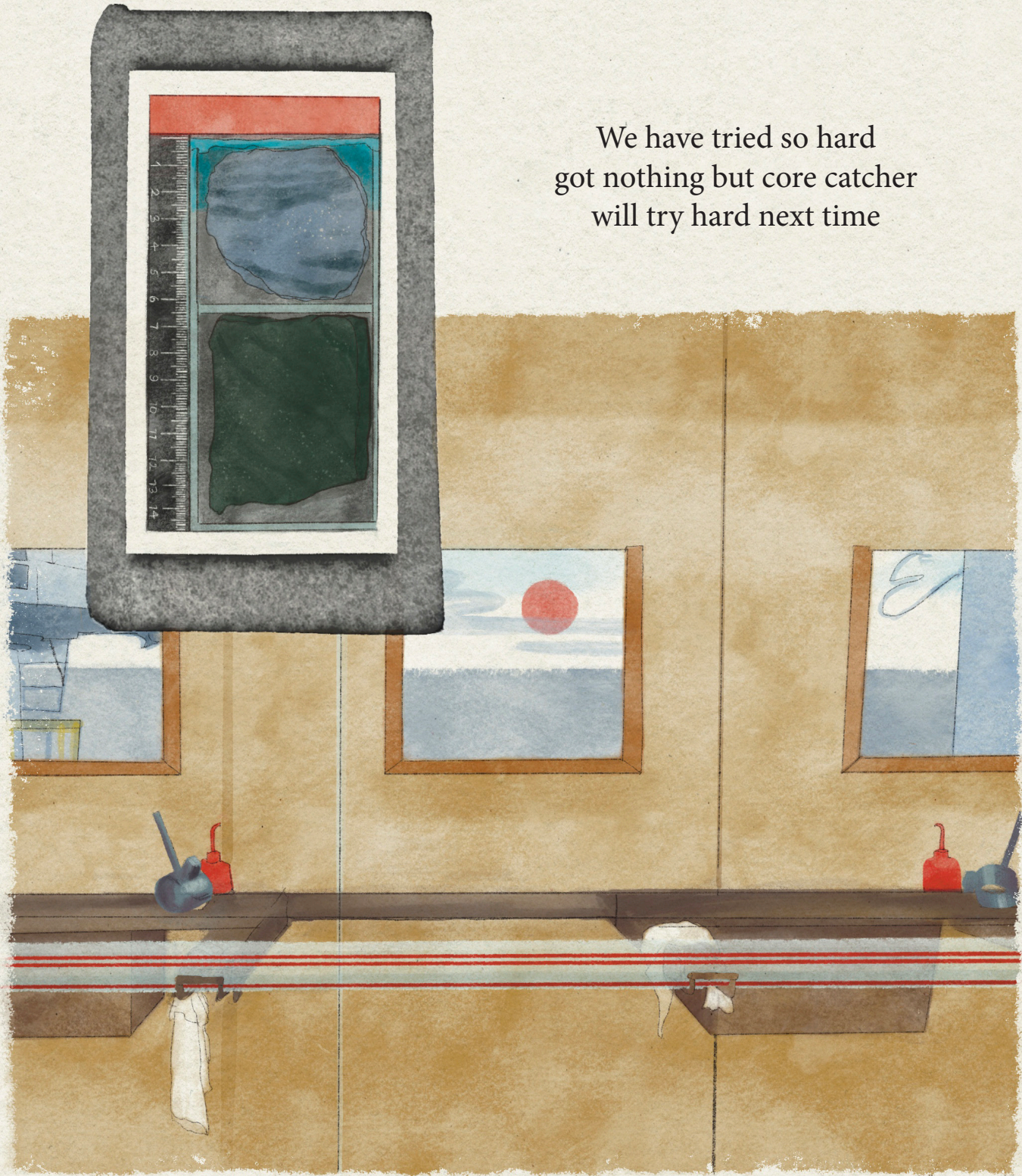
Moving across time
Who is carbon king and pawn—
What controls this game?

Fragmented gradient
mysterious origins
secrets to emerge



Zeolite is an
Earth mineral, mean and green
as Oscar the Grouch

THOMAS
CORREAS
4
3
WESTERHOLD



We have tried so hard
got nothing but core catcher
will try hard next time

The sorrow of an
empty liner – mocking our
attempts to advance.

LAUREL
CORREAS
4
4
CHILDRESS

PETER
CORREAS
4
5
DAVIDSON

A great transition
From sediments to lava
Everything changes

Creeping magma cooks
rocks black, green, red—who was hottest?
What may have been lost?

TOM
CORREAS
4
6
WAGNER

From deep inside the earth
I rose to conquer the world—
and was stopped by chert!

GABRIELLE
CORREAS
4
7
UENZELMANN
-
NEBEN

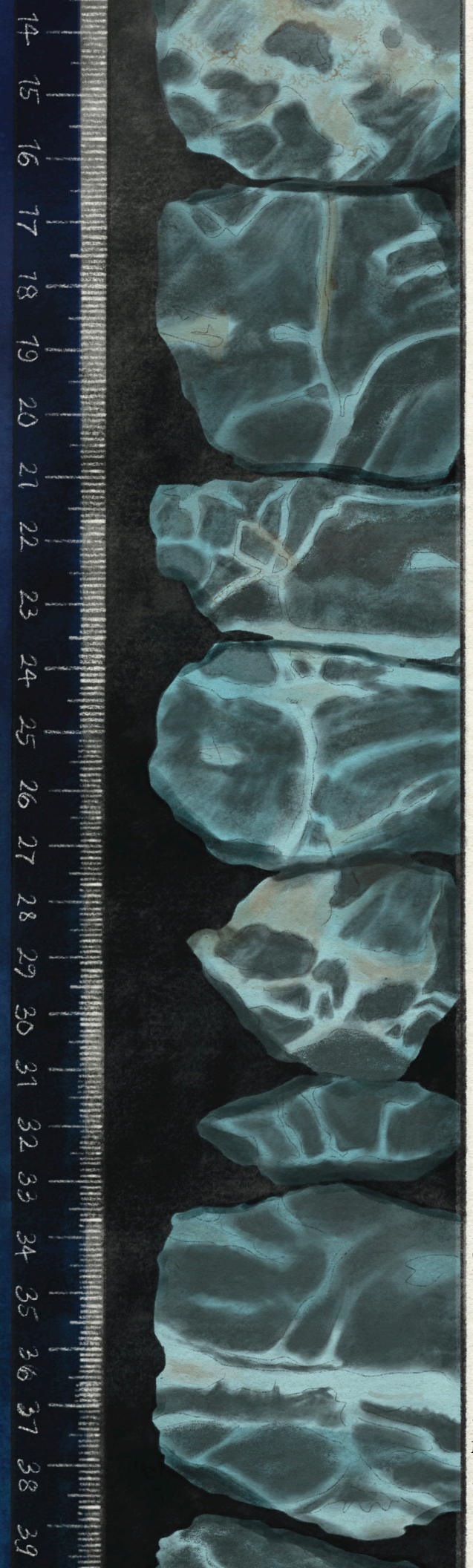
You stagger my depths—
recovering in scuttling
night tones, never touched.



Dare to discover
basalt rocks formed first on Earth
nucleus of rocks

Basalt weathering
makes celadonite and traps
carbon-di-oxide

Dark rock of the deep
ancient heat of Earth's forming
reclaims shells of life



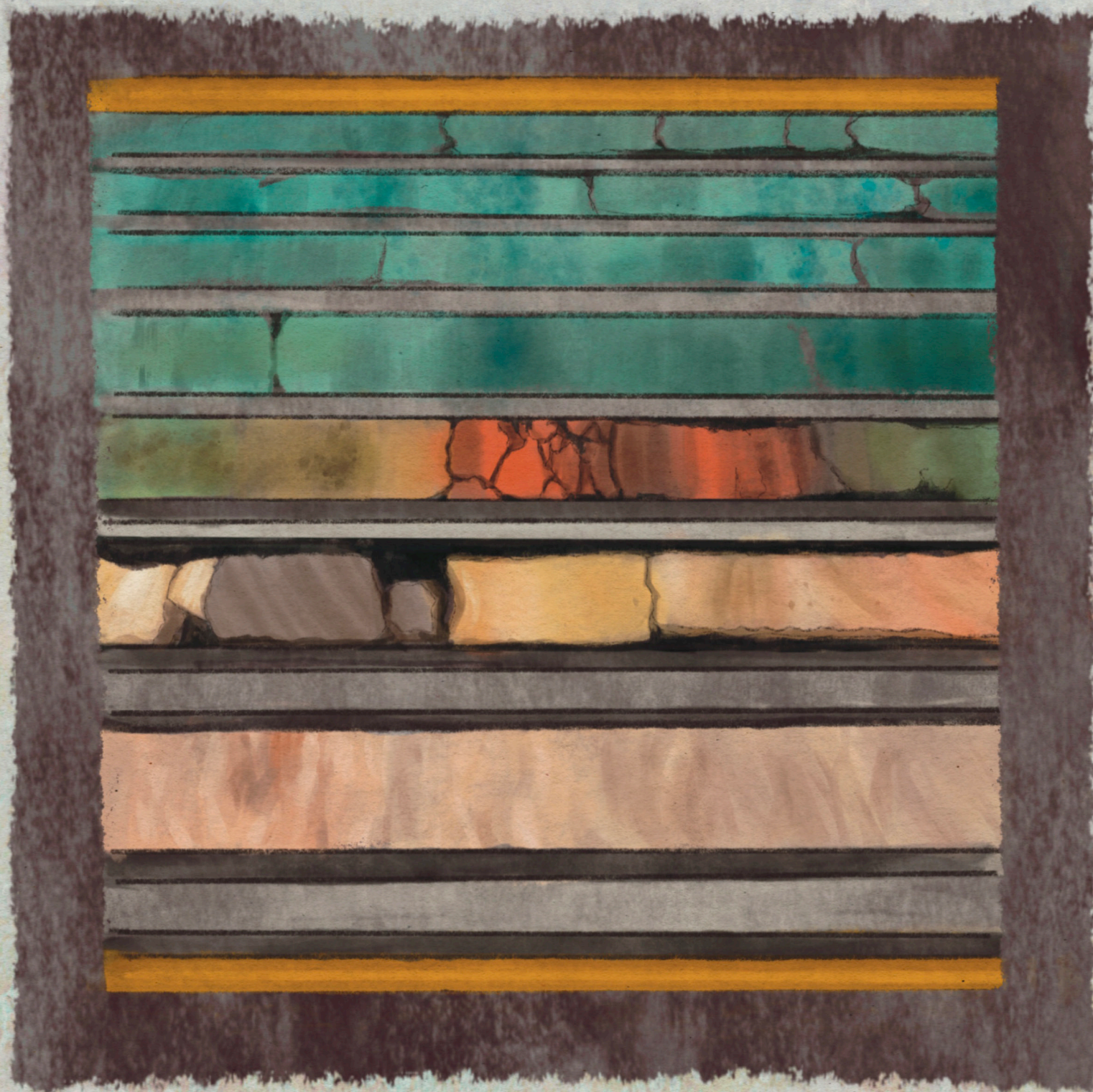
J
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R
R
L
E

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Y
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A
C
H
A
N
D
A

D
C
O
N
R
A
L
D
5
P
E
N
M
A
N

C
O
R
E
5
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D
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E
L

Dark green bands trace crown
Pockets of moss and faint stars
Fade into basalt



Layers and layers
white, red, green, the life marine
the rock's life story

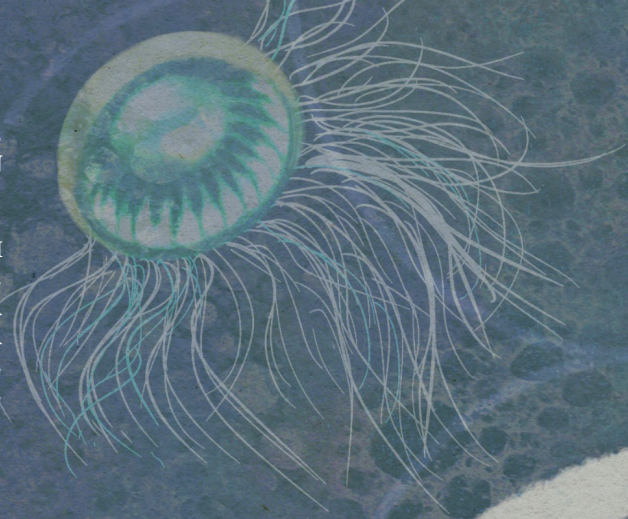
E
C
D
O
R
D
O
5
4
D
A
L
L
A
N
A
V
E

It is black this one,
and stays normal, head to toes
what does it tell us?

Dark like the new moon
above, basalt that formed
millions of years past.

C
J
O
M
R
E
S
5
3
M
C
M
A
N
U
S

S
C
H
O
R
E
N
O
N
5
5
H
A
Y
E
S



Secrets of oceans
buried ancient life—discover
hidden past for most



Caught between two sills
condemned to existence in
darkness and pressure

A hiatus is
A recess of missing time –
What do we not see?



An exhalation
of gas in magma leads to
rock with vesicles



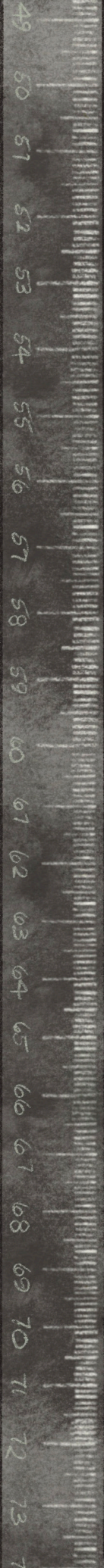
Big surprise appears
sediments below thick basalt
baked to perfection



Subtle colored bands—
where rocks were burnt by heat from
ancient volcanoes



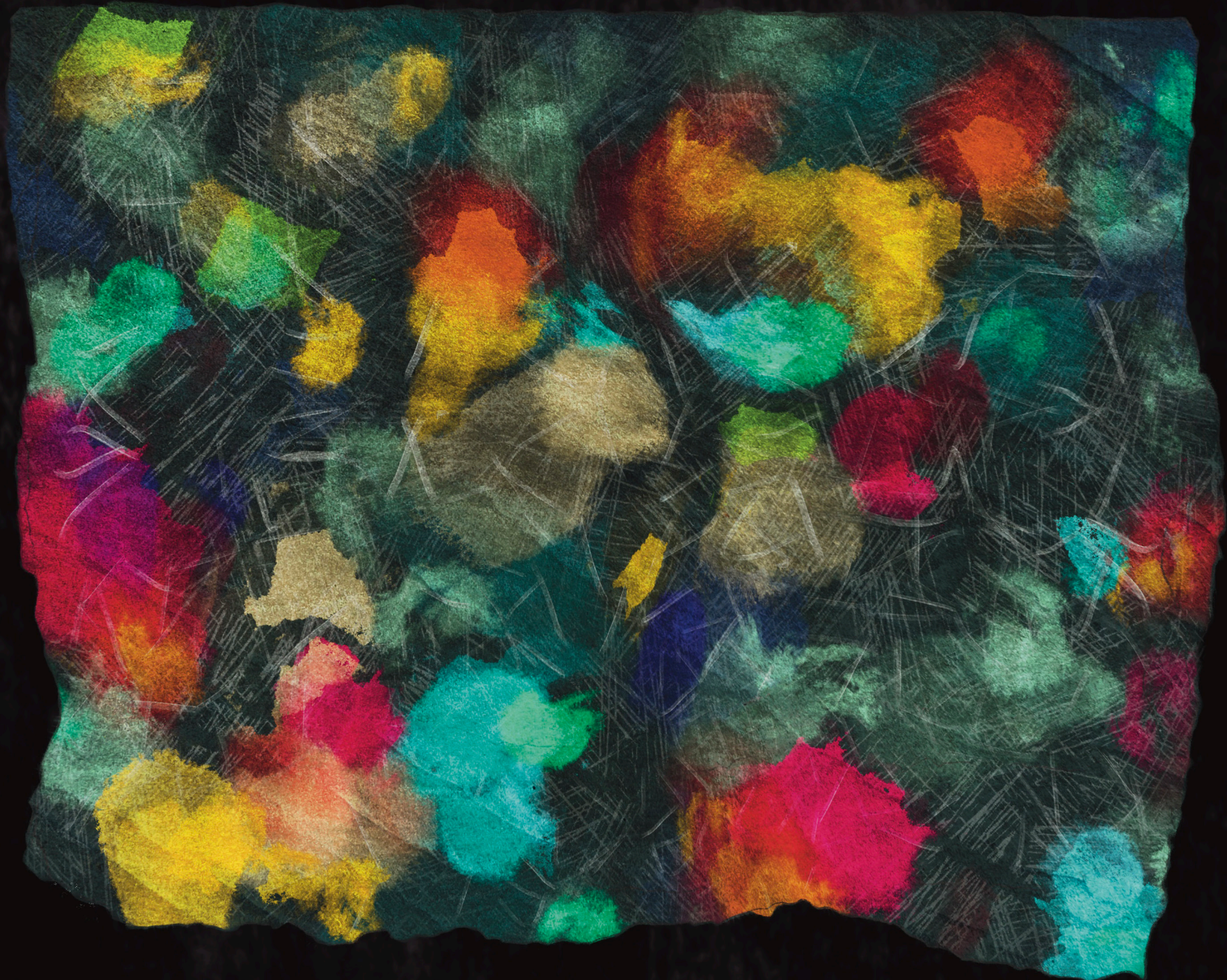
A chilled margin shows
molten rock met sediment
not pleasant for both



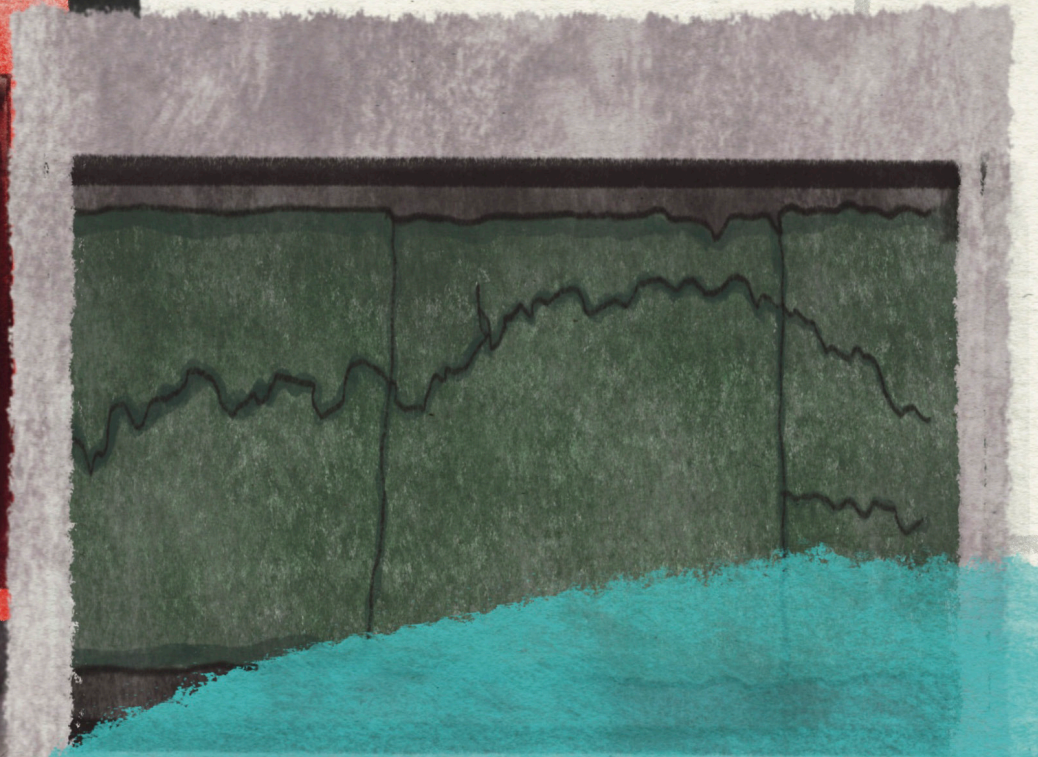
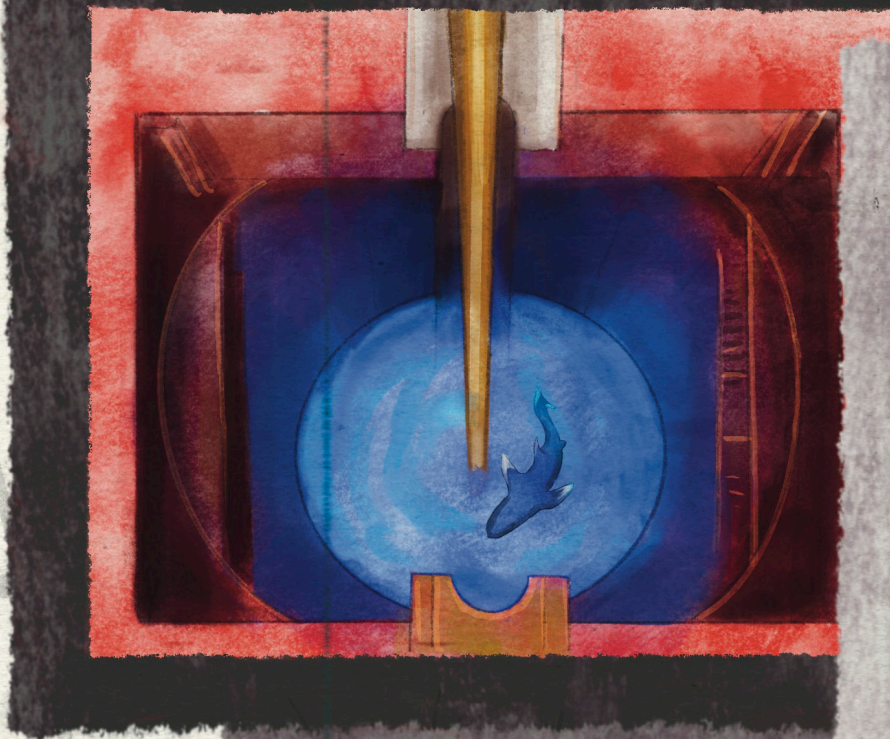
Molten magma formed
Olivine, pyroxene and
feldspar, last and least!

I think that I shall
never see a fresh basalt
as lovely as thee.

Taking time to cool,
large crystals give us a hint
of this magma's past



When fresh rocks exchange
elements with seawater
it's alteration



Within the stone
that the stone holds the stone
fingers interlocking fingers




EOH - EOS - EOX -

Ode to the best bit
whose courage and fortitude
carried us so deep



Your loveliest lines
lie, left under layers, in
faults, slips and failures.



“This is the first scientific drilling effort to directly sample the basement rocks of the Agulhas Plateau and the overlying sedimentary strata, thereby providing a unique and unprecedented view into the plateau’s origin and subsequent climate history.”

~Co-Chief scientist Steven Bohaty, Heidelberg University, Germany

“This is the first time this early phase of development of this particular gateway, and especially water mass exchange between the Indian, Southern, and South Atlantic oceans, will be the target of scientific drilling. And this, in comparison to existing ODP and IODP drill sites from the Kerguelen and Naturaliste plateaus, will significantly advance the understanding of Large Igneous Province formation and the evolution of ocean temperature, circulation, and sedimentation patterns during the Cretaceous.”

~Co-Chief scientist Gabriele Uenzelmann-Neben, Alfred Wegener Institute, Germany

The International Ocean Discovery Program drilling cruise to the Agulhas Plateau investigates the interplay between changes in global climate, ocean depth, and ocean circulation. It aims to recover first-ever deep geologic samples from this large oceanic plateau situated approximately 500 km south of South Africa. The team targeted five sites for sampling, some more than 4,000 meters below the sea surface. This feat of engineering involved drilling down through thick sedimentary layers to reach the lava flows below. The goals of the science team include determining the origin of the plateau while reconstructing the processes that followed the opening of ocean gateways in the Southwest Indian Ocean over the past ~120 million years and associated climatic responses.

This plateau is thought to be the remains of a volcanic eruption that occurred when Gondwana broke up into Antarctica, Africa, and South America, originally forming at, or near, sea-level. The sediments laid down on top of the plateau since its formation, now more than 1 km thick in places, record the long-term changes in paleo-climate and ocean circulation as the Earth evolved from warm, greenhouse conditions in the Cretaceous to a cooler world with polar ice sheets in the Cenozoic.

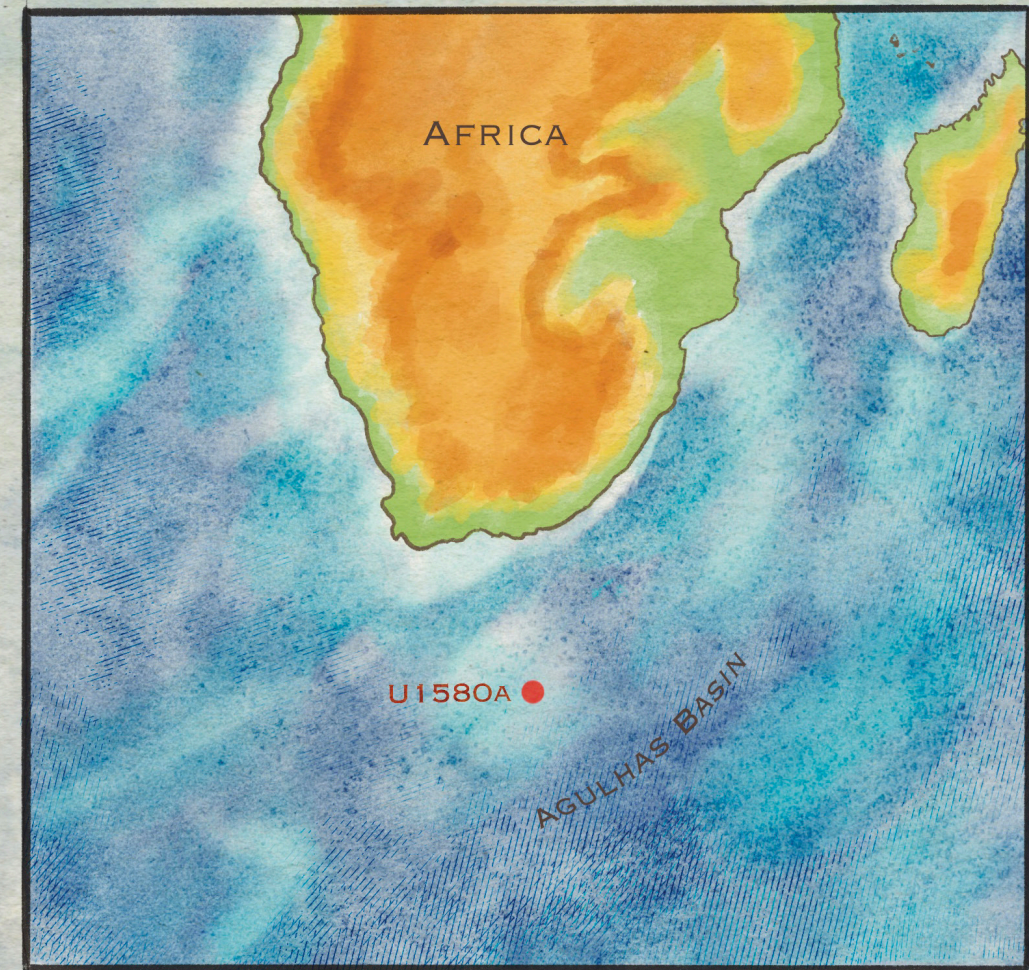
It has been suggested that significant changes in past ocean and atmospheric circulation related to evolving depth of oceanic gateways drove regional- and global-scale climate change. The Africa – Southern Ocean Gateway that connects the Indian and Atlantic oceans opened but then was obstructed by the formation of the plateau, which hindered water mass exchange.

Incomplete sedimentary records from the southern high-latitudes make it challenging to understand Earth's oscillatory cooling transition from the Cretaceous Hothouse (peaking at about 90 million years ago) to the mid-Cenozoic Icehouse (starting 34 million years ago), and therefore difficult to assess the relationship between climate change and gateway evolution.

By gathering rocks from far below the seabed, Expedition 392 seeks to develop a greater understanding of:

- the origin of the Agulhas Plateau and the timing of its emplacement;
- the interplay between ocean circulation, the formation of the Agulhas Plateau as an obstruction, and changes in regional and global climate;
- episodic climate change and the response of high-latitude marine plankton communities in greenhouse periods of Earth history;
- and the long-term evolution of climate from the Cretaceous to the Cenozoic.

Scientific drilling of Cretaceous records on the Agulhas Plateau will recover rocks and sediment samples that provide fundamental insight into the complex interplay between southern African climate evolution; ocean redox (a process in which one substance or molecule is reduced and another oxidized, with oxidation and reduction considered together as complimentary processes); nutrient development and associated organic carbon burial; and multi-scale volcanic activity in the young and still-small Southern Ocean basin. Its location at a high southern paleo-latitude makes the Cretaceous archive of the Africa-Southern Ocean gateway a particularly valuable target.



A dedication in 17 syllables

*For Bri and Kailey
Caroline and Greg, plus One!
and Brian, my rock*

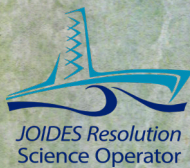
~M.Y.

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