

Mental Health in the Geosciences



**Gulf of Maine
Research Institute**

Science. Education. Community.

Why are we here?

- In climate and/or geoscience?
- At <institution>?
- Part of the OceanHackWeek community?
- Having this conversation?

Who am I



- Web application developer at the Gulf of Maine Research Institute

Who am I



- Web application developer at the Gulf of Maine Research Institute
- On the data management team for NERACOOS
- OceanHackWeek steering committee member and infrastructure wrangler
- Xpublish and IOOS tool hacker





Stress

Mental Health in the Geosciences



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Research Institute

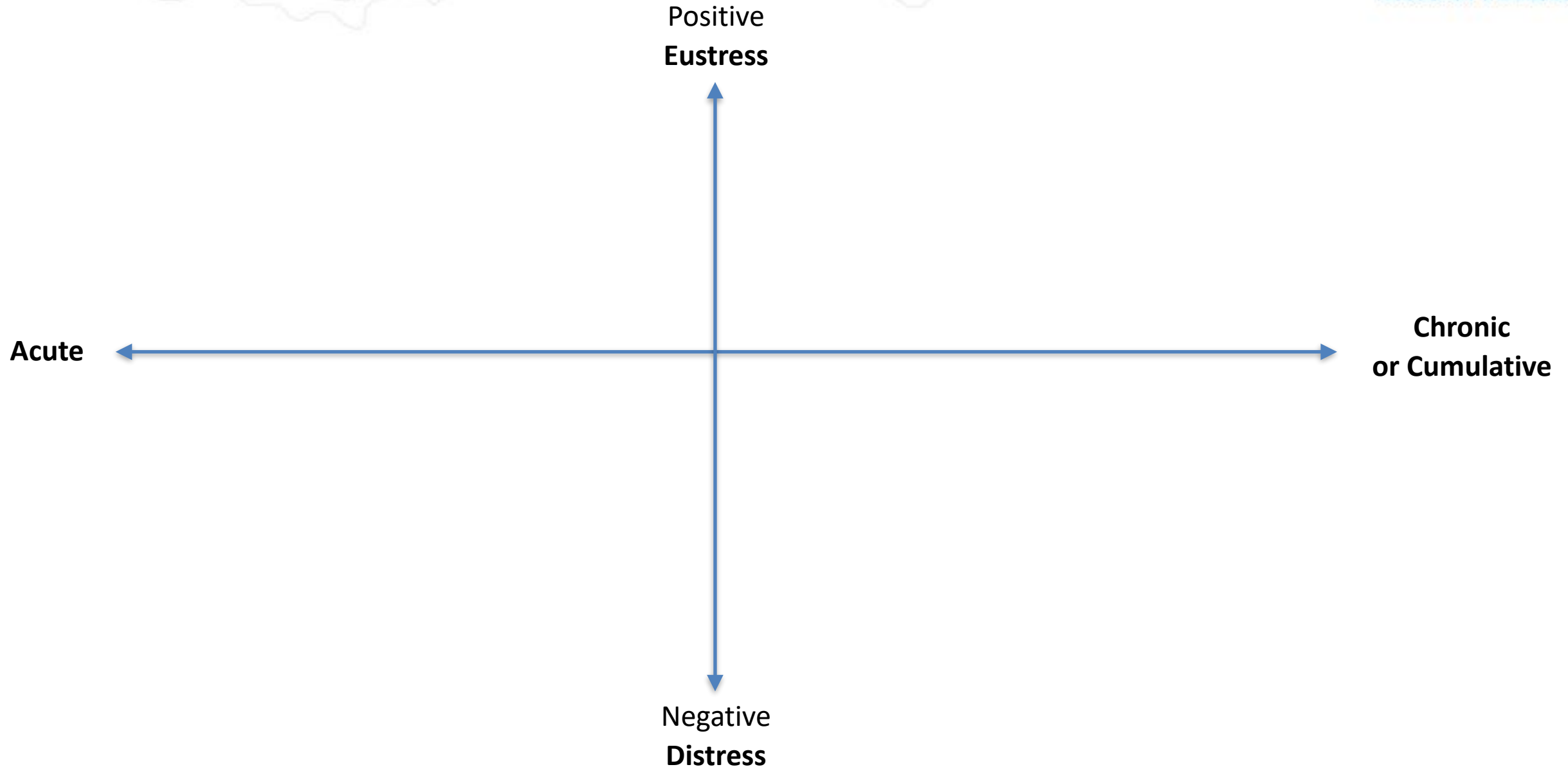
Science. Education. Community.

What is stress?

Stress is a normal human reaction that happens to everyone. In fact, the human body is designed to experience stress and react to it. When you experience changes or challenges (stressors), your body produces physical and mental responses. That's stress.

Stress responses help your body adjust to new situations. Stress can be positive, keeping us alert, motivated and ready to avoid danger. For example, if you have an important test coming up, a stress response might help your body work harder and stay awake longer. But stress becomes a problem when stressors continue without relief or periods of relaxation.

Stress (like many things) occurs on continuums



What is a stress injury?

- Injury because it is treatable and not a permanent condition
- Operational stressors have three primary sources:
 - Critical incidents - Direct trauma
 - Daily hassles - organizational challenges
 - Relational stressors - managing relationships

Stress Continuum Model

| READY (Green) | REACTING (Yellow) | INJURED (Orange) | ILL (Red) |
|--|---|--|--|
| DEFINITION <ul style="list-style-type: none"> Optimal functioning Adaptive growth Wellness FEATURES <ul style="list-style-type: none"> At one's best Well-trained and prepared In control Physically, mentally and spiritually fit Mission-focused Motivated Calm and steady Having fun Behaving ethically | DEFINITION <ul style="list-style-type: none"> Mild and transient distress or impairment Always goes away Low risk CAUSES <ul style="list-style-type: none"> Any stressor FEATURES <ul style="list-style-type: none"> Feeling irritable, anxious or down Loss of motivation Loss of focus Difficulty sleeping Muscle tension or other physical changes Not having fun | DEFINITION <ul style="list-style-type: none"> More severe and persistent distress or impairment Leaves a scar Higher risk CAUSES <ul style="list-style-type: none"> Life threat Loss Moral injury Wear and tear FEATURES <ul style="list-style-type: none"> Loss of control Panic, rage or depression No longer feeling like normal self Excessive guilt, shame or blame Misconduct | DEFINITION <ul style="list-style-type: none"> Clinical mental disorder Unhealed stress injury causing life impairment TYPES <ul style="list-style-type: none"> PTSD Depression Anxiety Substance use disorders FEATURES <ul style="list-style-type: none"> Symptoms persist and worsen over time Severe distress or social or occupational impairment |

RESPONDER STRESS CONTINUUM

READY

Sense Of Mission
Spiritually &
Emotionally Healthy
Physically Healthy
Emotionally Available
Healthy Sleep
Gratitude
Vitality
Room For Complexity

REACTING

Sleep Loss
Change In Attitude
Criticism
Avoidance
Loss Of Interest
Distance
From Others
Short Fuse
Cutting Corners
Loss Of Creativity
Lack Of Motivation
Fatigue

INJURED

Sleep Issues
Emotional Numbness
Burnout
Nightmares
Disengaged
Exhausted
Physical Symptoms
Feeling Trapped
Relationships
Suffering
Isolation

CRITICAL

Insomnia
Hopelessness
Anxiety & Panic
Depression
Intrusive Thoughts
Feeling Lost Or
Out Of Control
Blame
Hiding Out
Broken Relationships
Thoughts Of Suicide

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Some of our Missions



We work together to protect our world's aquatic systems through high caliber teaching, research, service, and partnerships.

Collaborative solutions to global ocean challenges

We believe that for societies to thrive, we must all hold ourselves accountable for tomorrow. That means creating innovative solutions to the challenges the future will bring. It inspires us to stay curious, act locally and think internationally.

Our planet is a blue planet. Most of its expanse is covered by the ocean. This vast space is the lifeblood of our world, regulating the environment even more than the Amazon rainforest. Yet so much of our ocean is yet to be discovered and its value is so often overlooked. That's why we go further to gain a deeper understanding of our ocean and coastlines. Through ground-breaking research, collaboration and game changing innovation we will empower everyone to help them thrive. Our fate on this planet is bound up in our ocean and there is so much exciting power to harness in its depths. So here at ____, we go deeper.

From the Arctic to the Antarctic, ____ scientists use innovative approaches to study the foundation of global ocean health and unlock its potential to improve the future for all life on our planet.

We conduct, support, and promote science and communication regarding the sea and its dynamic processes. With a holistic approach, we explore the interaction between humans and the sea. Historically, at present, and in the future.

Climate change and biodiversity loss continue unabated, threatening sustainable development and our viability as a species. Unfortunately, the challenges are particularly evident when we look at the state of our planet's life support system – the ocean.

STRESS CONTINUUM FOR THE TEAM

| READY | REACTING | INJURED | CRITICAL |
|------------------------------------|----------------------------------|------------------------|------------------------|
| Transparency | Normalizing Depletion | Resources Scarce | Cliques And Hierarchy |
| Sense Of Mission | Staff Dreading Work | Rigid Perspectives | Lack Of Trust |
| Requests For Help Met With Support | Mistakes Are Personal | Members Undervalued | Gaslighting |
| Connection | Transactional Communication | Communication Silos | Culture Of Blame |
| Team Approach To Overwhelm | Requests For Help Are Criticized | Suffering In Silence | Vulnerability Punished |
| Curiosity Culture | | Helplessness | Fear At Work |
| Mission Satisfaction | Mission Drift | Mission Fatigue | Hopelessness |
| | | | Moral Injuries |

Cumulative Stress vs Potentially Traumatizing Event



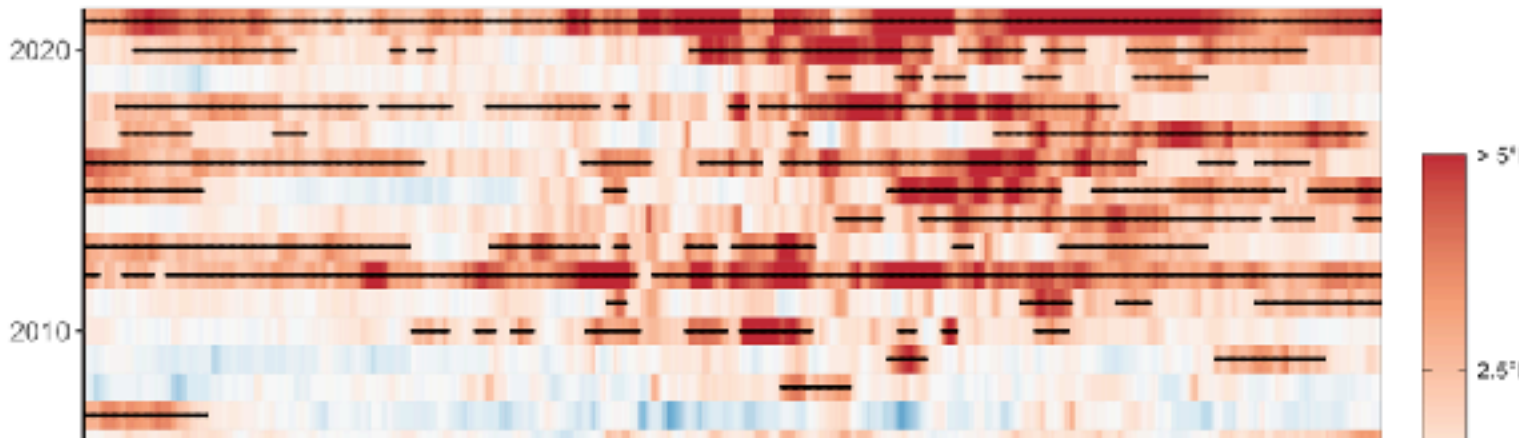
Hottest Days on Record

Gulf of Maine



Temperature data coverage period of 1982-2021

Temperature Anomalies and Marine Heatwave Events



The expectation that we can be immersed in suffering and loss daily and not be touched by it is as unrealistic as expecting to be able to walk through water without getting wet.

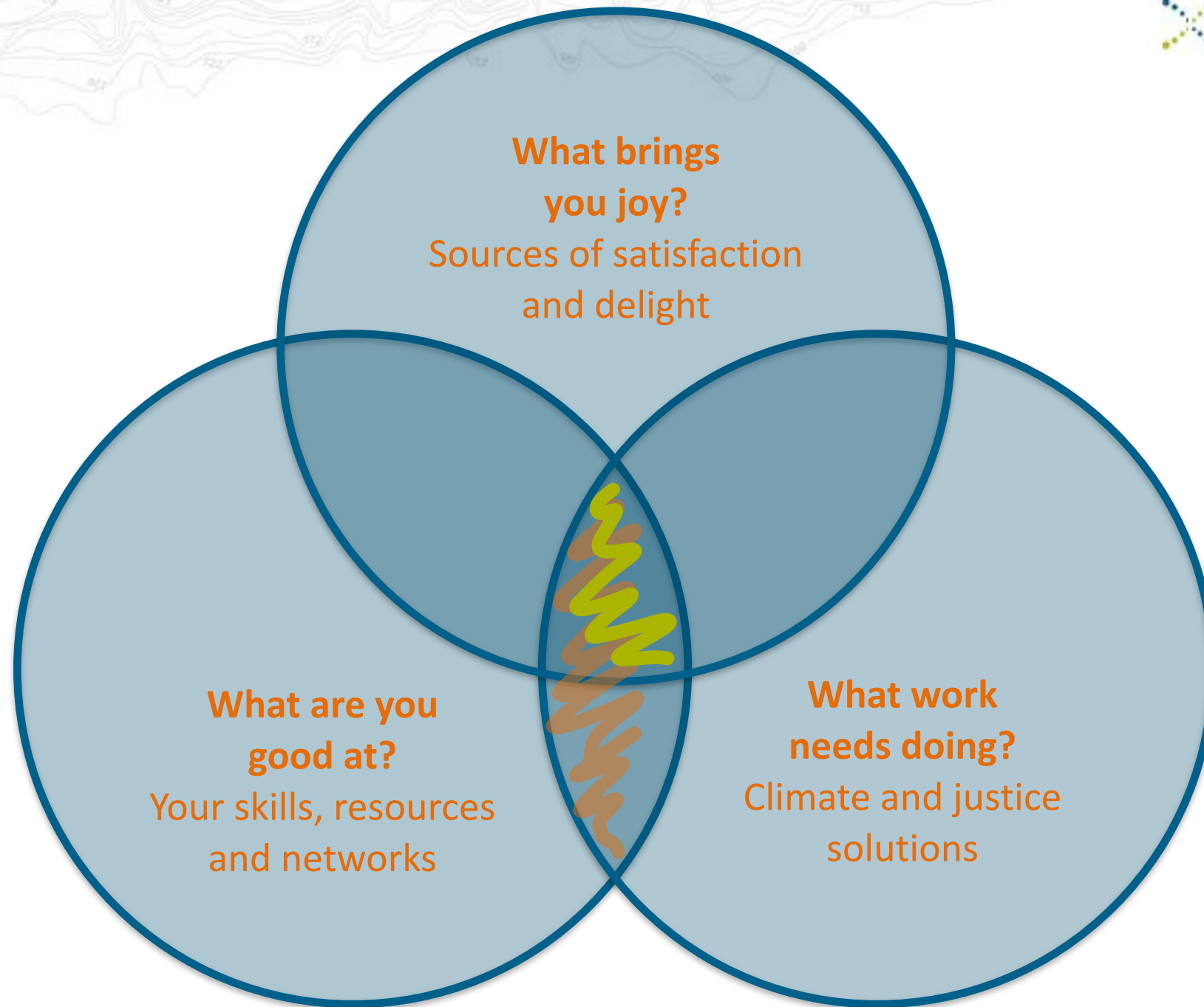
This sort of denial is no small matter. The way we deal with loss shapes our capacity to be present to life more than anything else. The way we protect ourselves from loss may be the way in which we distance ourselves from life and help.

We burn out not because we don't care but because we don't grieve. We burn out because we've allowed our hearts to become so filled with loss that we have no room to care.

- Rachel Naomi Remem

So, which Spock are you?





Charge your Battery



| | What charges your battery? | What drains your battery? |
|--------------|----------------------------|---------------------------|
| At work | | |
| Outside work | | |

You are not alone



Mika McKinnon @mikamckinnon

Field geophysicist, disaster researcher, sci-fi science consultant, science writer, public speaker, irrepressibly curious. #scicomm #womeninSTEM she/her 🇨🇦🇺🇸

...

It's been a long, shitty pandemic that's changed all of us. The fatigue is real. The burnout is real. The lure of submitting to defeat as it never fucking ends is real.

But just like with climate change, nihilism is kin to denialism.

It's never too late to make things less bad.

1:21 PM · Nov 10, 2021 · Twitter for iPhone

12 Retweets · 1 Quote Tweet · 52 Likes



Tweet your reply

Reply



Mika McKinnon @mikamckinnon · Nov 10, 2021

Replying to @mikamckinnon

Part of why I work in disasters is that it brings me comfort to know I'm making the world less bad.

Getting a flu shot is so small, so simple, so fast, but it protects those around you.

Small things like getting vaccinated add up, making the world just a little bit better.

Eos

Science News by AGU

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The Emotional Toll of Climate Change on Science Professionals

Earth scientists and communicators dealing with or studying climate change face many potential stressors. They need support and resources to maintain and improve their emotional well-being.

IS THIS HOW YOU FEEL?

[HOME](#) [ABOUT](#) [THIS IS HOW WE MEASURED](#) [HOW DO YOU FEEL?](#) [FOR TEACHERS](#) [BLOG](#) [HOW TO WRITE](#) [CONTACT](#)



The Scientists

Climate change is a complex and intimidating threat. You can't see it when you look out your backdoor window. Its impacts are often not immediately noticeable, nor are the best tools to detect it.

Lately there are a large group of passionate individuals who have dedicated their lives to studying climate change. These people write scientific research papers, inspecting every aspect of climate change, analyzing it thoroughly and critically. They understand the numbers, the facts and the figures. They know what is causing it, what the impacts will be and how we can minimize these impacts.

But they're not robots. These scientists are mothers, fathers, grandparents, daughters. They are real people. And they're concerned.

Letters written in 2009
Below are a selection of first time contributors to EOS



Emotion, Space and Society
Volume 24, August 2017, Pages 34-41



Keeping the heart a long way from the brain: The emotional labour of climate scientists

Mental health risk and resilience among climate scientists

[Susan Clayton](#)

[Nature Climate Change](#) 9, 260–261 (2018) | [Cite this article](#)

5453 Accesses | 21 Citations | 251 Altmetrics | [Metrics](#)

Awareness of the threats to mental health posed by climate change leads to questions about the potential impacts on climate scientists because they are immersed in depressing information and may face apathy, denial and even hostility from others. But they also have sources of resilience.

You are not alone



Dr. Wendy Bohon
@DrWendyRocks

Geology MSc, PhD | AAAS If/Then Ambassador | Mom of 3 | #SciComm |
Insta: @DrWendyRocks; TikTok:
@DrWendyRocksT @TerraExplore |
she/her | vlogs mine

I'm behind at home and at work but I'm also exhausted and fighting burnout. So I took the morning off and read a book (while hiding in a pillow fort).

I'm no use to anybody if I'm not healthy.



Dr. Jacquelyn Gill
@JacquelynGill

Researching Earth's past and present for a better future. Podcaster for the planet. Chaotic good professor. Naturalist. #TeamMuskOx for climate. She/her 🏳️‍🌈

This is a terrible day in a terrible week in a terrible month in a terrible year in a terrible decade if you value justice, equality, bodily autonomy, compassion, freedom, and human rights. All I have to offer in this moment is: we must take care of each other. We must not stop.

12:38 PM · Jun 23, 2022 · Twitter Web App

306 Retweets · 12 Quote Tweets · 1,632 Likes



Tweet your reply

Reply



Dr. Jacquelyn Gill · @JacquelynGill · Jun 23
Replying to @JacquelynGill

Things I am reminding myself while I breathe: 1) It feels like far, far too many problems, but it is really only a few (white supremacy, patriarchy, capitalism). Recognizing this correctness means that all the work we do in one area makes a difference in all the other areas.

1

56

226



Dr. Jacquelyn Gill · @JacquelynGill · Jun 23

2) Remember the Mr. Rogers quote, "look for the helpers?" I don't care how tiring it is. It's true. People ARE doing that work and they need your help. And I've found that helping is hands-down the best solution to feeling helpless. It's certainly worth a try before giving up.

2

33

227



Dr. Jacquelyn Gill · @JacquelynGill · Jun 23

3) We need to resist the urge to turn inwards in times of strife. Individualism is not going to save us. Instead of prepping and stockpiling and giving in to cynicism, strengthen your community. Connect with your neighbors. Feed someone. Donate. Volunteer. Run for local office.

6

16

214



How Coral Researchers Are Coping With the Death of Reefs



Gulf of Maine
Research Institute



Pete D. Akers
@PeteScientist

Paleoclimatologist, stable isotope geochemist, geographer, stal and ice enthusiast. Assistant professor of physical geography at Trinity College Dublin.

Replying to @JacquelynGill

A student eval I once had in a class was "he was the first teacher to make me feel like climate change was something we could still do something about". Which is crazy bc I thought was being straightforward & blunt. But also not fatalist and stated "the world isn't going to end"

2:14 PM · May



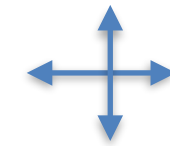
Chris Holdgraf
@choldgraf

Executive Director @2i2c_org.
@ProjectJupyter+@mybinderteam.
open communities open
infrastructure team science
education communication
He/Him

I just realized that the image from Spiderman where he's trying to keep two halves of a boat from falling apart into the ocean is a great metaphor for maintainer burnout



Positive
Eustress



Chronic
or Cumulative

Negative
Distress

Acute



BATTERY SNAPSHOT

What charges the battery?

- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐



What drains the battery?

- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

RESPONDER STRESS CONTINUUM

| READY | REACTING | INJURED | CRITICAL |
|--|---|---|--|
| <p>Sense Of Mission</p> <p>Spiritually & Emotionally Healthy</p> <p>Physically Healthy</p> <p>Emotionally Available</p> <p>Healthy Sleep</p> <p>Gratitude</p> <p>Vitality</p> <p>Room For Complexity</p> | <p>Sleep Loss</p> <p>Change In Attitude</p> <p>Criticism</p> <p>Avoidance</p> <p>Loss Of Interest</p> <p>Distance From Others</p> <p>Short Fuse</p> <p>Cutting Corners</p> <p>Loss Of Creativity</p> <p>Lack Of Motivation</p> <p>Fatigue</p> | <p>Sleep Issues</p> <p>Emotional Numbness</p> <p>Burnout</p> <p>Nightmares</p> <p>Disengaged</p> <p>Exhausted</p> <p>Physical Symptoms</p> <p>Feeling Trapped</p> <p>Relationships Suffering</p> <p>Isolation</p> | <p>Insomnia</p> <p>Hopelessness</p> <p>Anxiety & Panic</p> <p>Depression</p> <p>Intrusive Thoughts</p> <p>Feeling Lost Or Out Of Control</p> <p>Blame</p> <p>Hiding Out</p> <p>Broken Relationships</p> <p>Thoughts Of Suicide</p> |

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STRESS CONTINUUM FOR THE TEAM

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|--|--|--|--|
| <p>Transparency</p> <p>Sense Of Mission</p> <p>Requests For Help Met With Support</p> <p>Connection</p> <p>Team Approach To Overwhelm</p> <p>Curiosity Culture</p> <p>Mission Satisfaction</p> | <p>Normalizing Depletion</p> <p>Staff Dreading Work</p> <p>Mistakes Are Personal</p> <p>Transactional Communication</p> <p>Requests For Help Are Criticized</p> <p>Mission Drift</p> | <p>Resources Scarce</p> <p>Rigid Perspectives</p> <p>Members Undervalued</p> <p>Communication Silos</p> <p>Suffering In Silence</p> <p>Helplessness</p> <p>Mission Fatigue</p> | <p>Cliques And Hierarchy</p> <p>Lack Of Trust</p> <p>Gaslighting</p> <p>Culture Of Blame</p> <p>Vulnerability Punished</p> <p>Fear At Work</p> <p>Hopelessness</p> <p>Moral Injuries</p> |

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