

# ESA Earth Observation Perspective

Space Science Week

23 March 2021

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"Science, Applications and Climate"

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ESA EO Vision:



Taking the Pulse of our Planet



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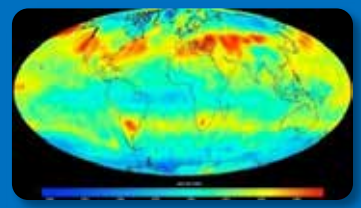
# Science: Earth Explorers



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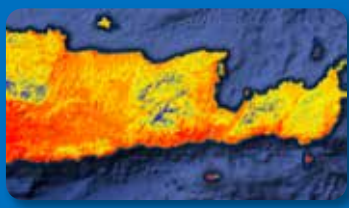
# Copernicus Sentinel Expansion Missions

**CO2M - Anthropogenic CO<sub>2</sub> Monitoring**



Causes of Climate Change

**LST – Land Surface Temperature Mission**



Agriculture & Urban Management

**CRISTAL – Polar Ice & Snow Topography**



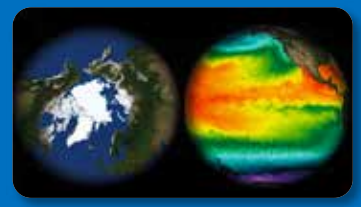
Effects of Climate Change

**CHIME – Hyperspectral Imaging Mission**



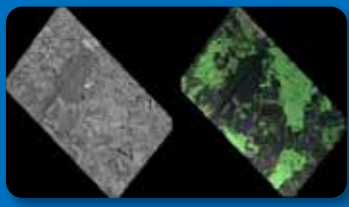
Food Security, Soil, Minerals, Biodiversity

**CIMR – Passive Microwave Radiometer**



Sea: Surface Temp. & Ice Concentration

**ROSE-L – L-band SAR Mission**



Vegetation & Ground Motion & Moisture

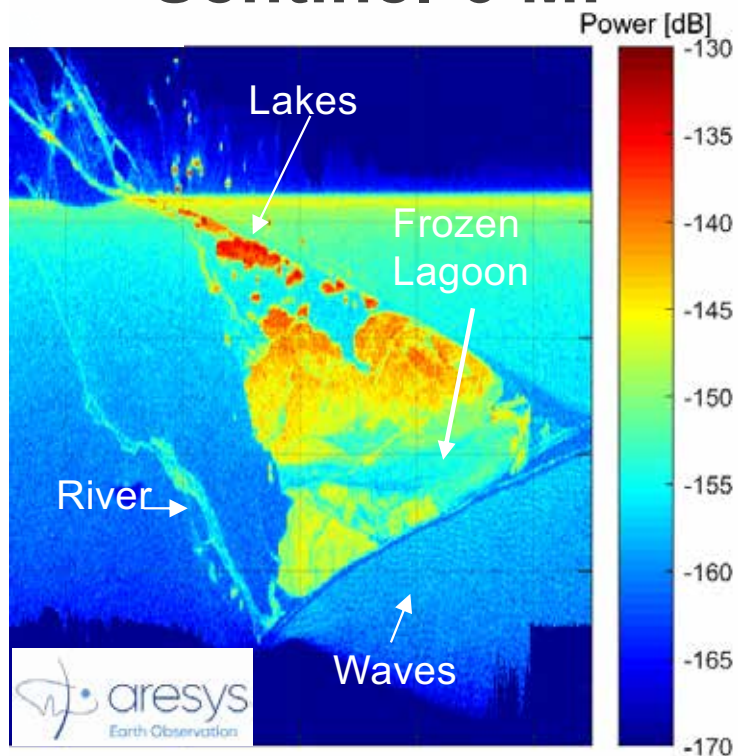
**All contracts were signed in 2020**



# First Sentinel-6 across track SAR Range Image



## Sentinel-6 MF



## Sentinel-2B



10m, Ozero Nayvak peninsula, Russia  
19 October 2020

## Sentinel-1B



Interferometric Wide Swath  
29 Nov 2020

(a) LRM (b) Fully Focussed SAR Range image  
30 Nov 2020



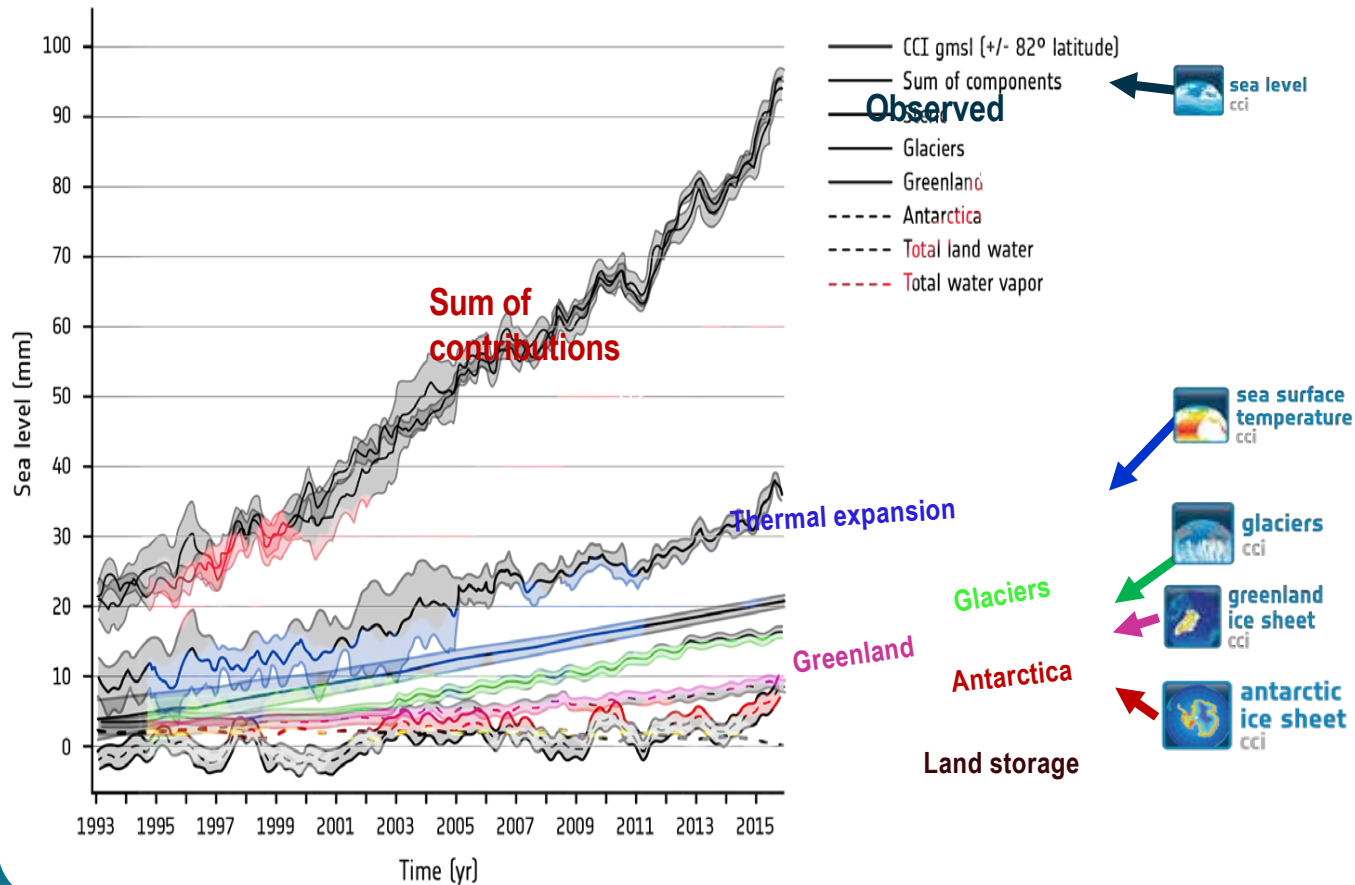
# Sentinel-6 Michael Freilich was just launched

## It will continue to measure sea-level changes



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# Sea level rise: confidence in the contributions



Sea levels are rising with acceleration in recent decades due to increasing rates of ice loss from the Greenland and Antarctic ice sheets (*very high confidence*) as well as continued glacier mass loss and ocean thermal expansion.

*IPCC Special Report on Oceans and Cryosphere in a changing climate (2019)*

Legouis et al (2018) Earth Sys. Sci. Data, 2018

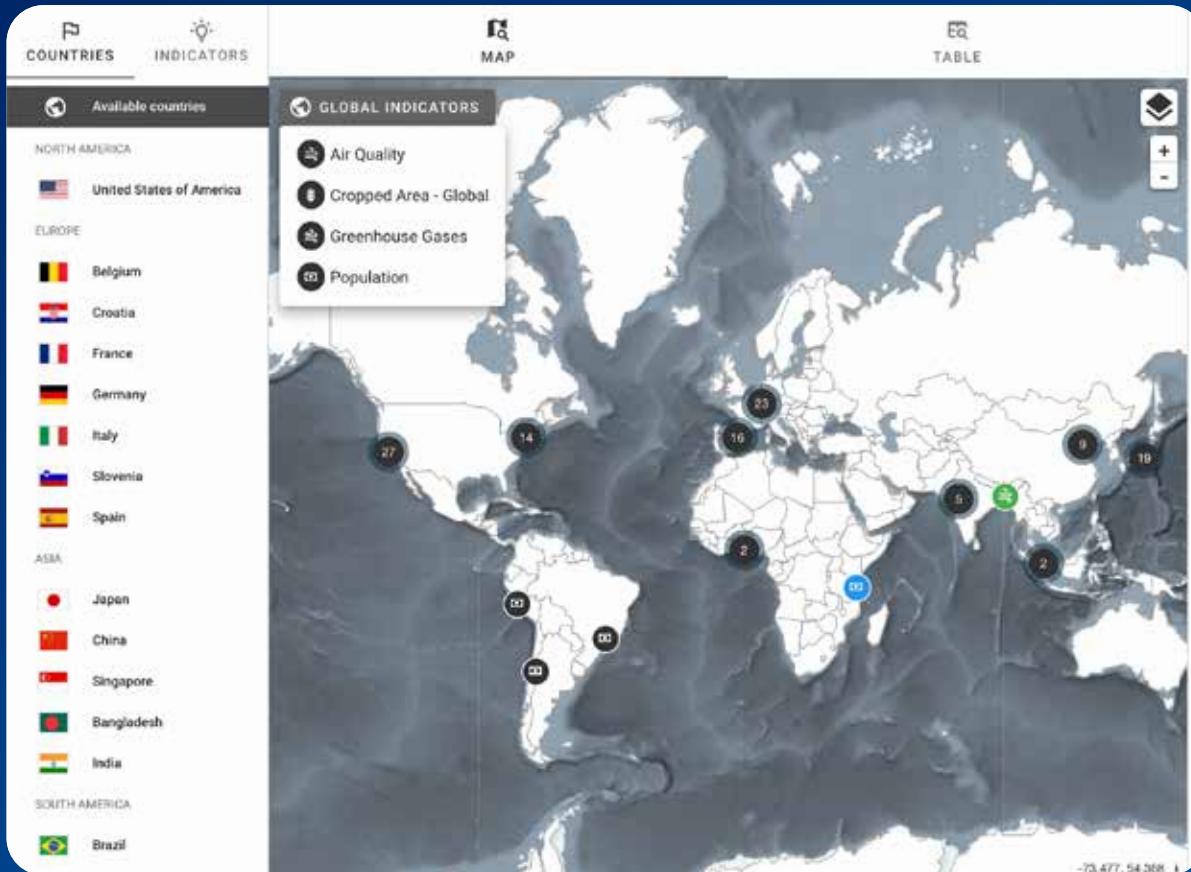


Our world is losing ice at a record rate



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# ESA-NASA-JAXA Dashboard - eodashboard.org

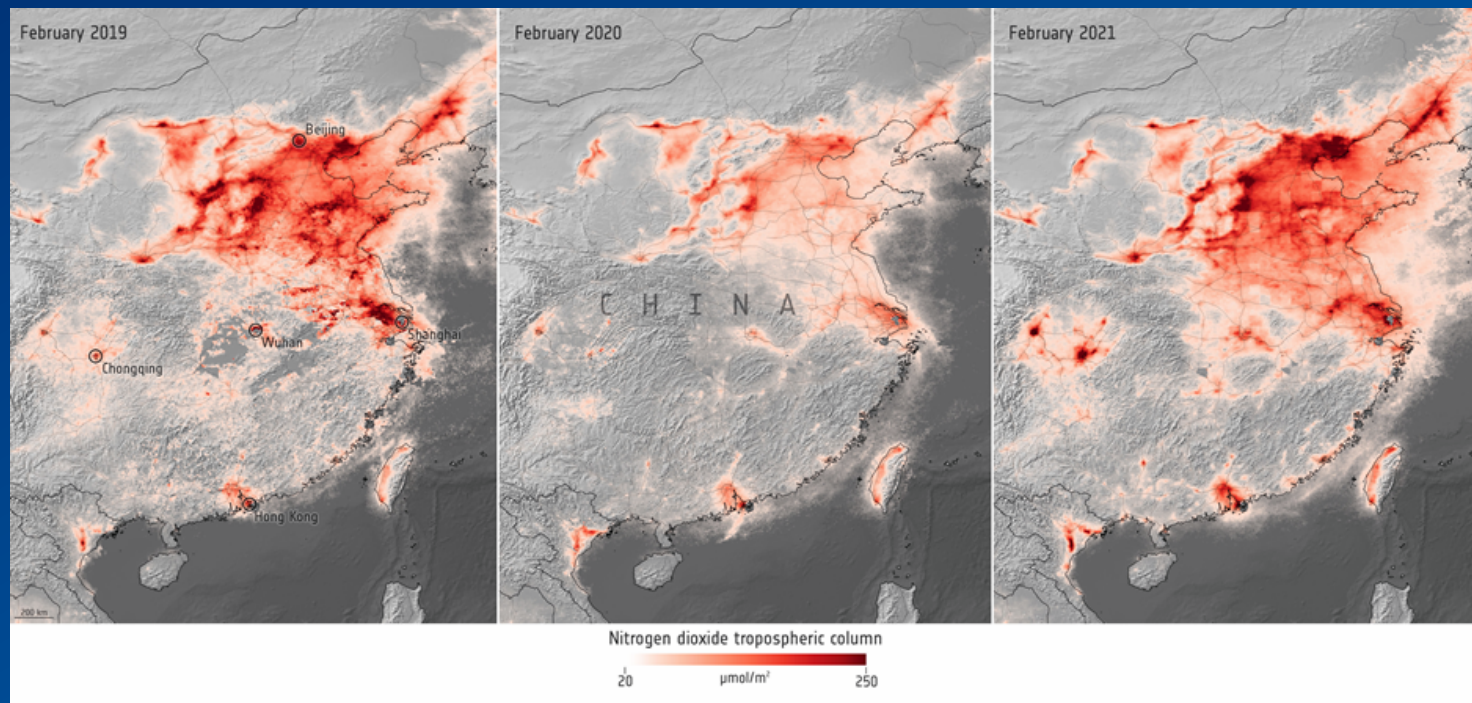


Trilateral Dashboard  
extended with NASA  
and JAXA until June  
2021



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# Pollution pre, during, and post lock-down



Feb 2019-Feb 2021

Copernicus Sentinel-5P

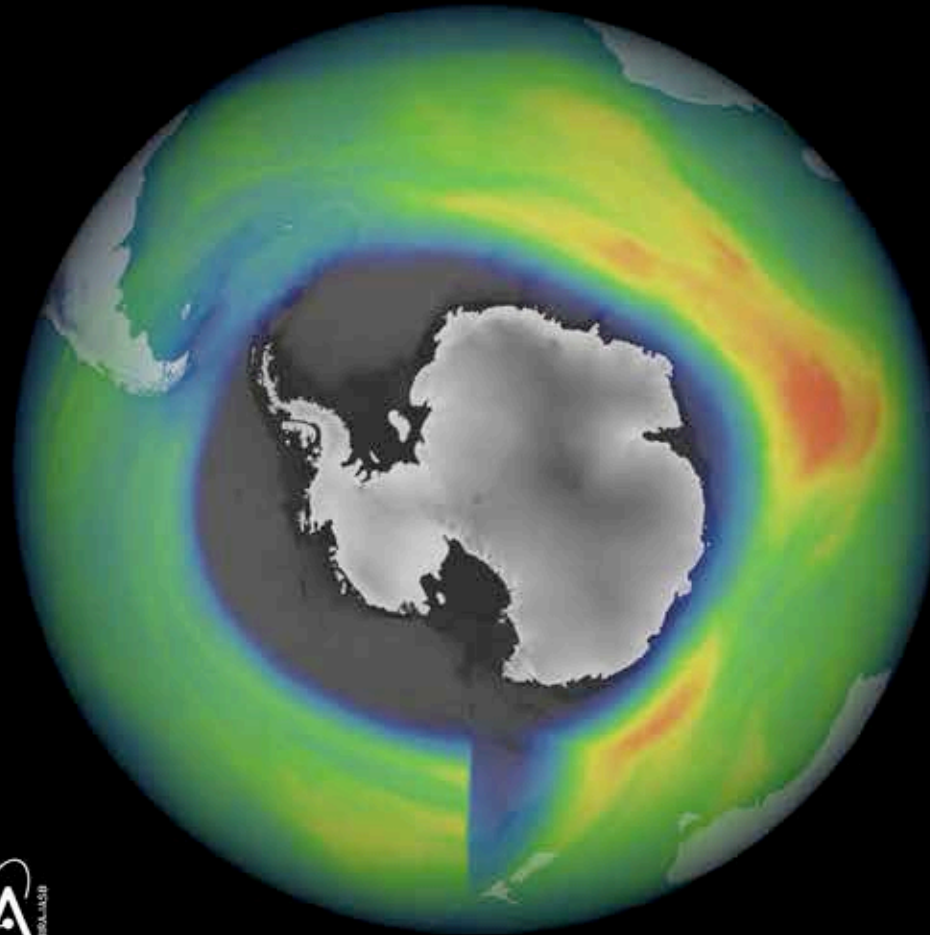


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# Large ozone hole over the Antarctic



Sentinel 5P  
TROPOMI  
DAILY OZONE  
25-09-2020



DLR – Earth Observation Center (EOC)

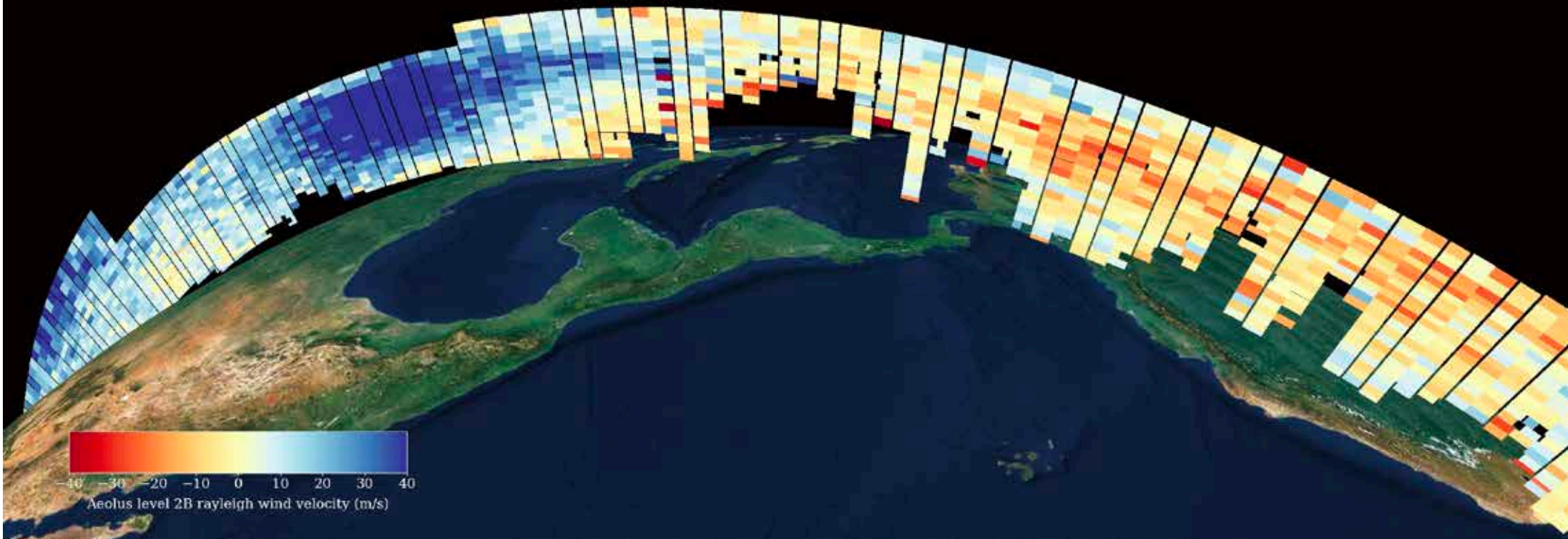


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# Earth Explorer Aeolus data operational & impactful



Aeolus gauges hurricane Lota wind velocities  
17 November 2020



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# EO in the 2020s – 3 key challenges for ESA EO



## Map the Climate and Biodiversity Crises

EO is key in understanding our natural world and its complexity



## Develop next generations of EO missions & systems

- Maintain European EO competences
- System of systems architecture
- Push frontiers of tech & scientific knowledge



## Multiply the societal value of EO



Fully deploy disruptive innovation ...



... to boost EO economy & European competitiveness



# Thanks for your attention!

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