### The Planetary Computer: Putting Global-Scale Geospatial Data to Work for Conservation and Sustainability

gratuitous pictures of animals that aren't related to my talk Dan Morris Microsoft AI for Earth dan@microsoft.com aka.ms/aiforearth aka.ms/dmorris







# Al for Earth is three things...







#### Grants aka.ms/ai4egrants

ML stuff aka.ms/ai4etech

Planetary Computer aka.ms/planetarycomputer

## Al for Earth: our grants program

# 850+

grants

# 120+

countries

# aka.ms/ai4egrants

### **GEO-Microsoft RFP**



### aka.ms/geogrant

### Al for Earth: grantee stories

Microsoft Al for Earth grantee gallery Profiles Published papers Open-source code Applications, APIs, and demos



#### Profiles

Al for Earth supports organizations all around the world that are working on challenges in biodiversity conservation, climate change, agriculture, and water. Read more about the Al for Earth grantees and the amazing projects they're working on in environmental sustainability.

#### Collapse -

#### AdaViv Using AI to unleash the potential of urban agriculture

AdaViv is developing an adaptive and efficient indoor growing system on Azure that uses sensors, actuators, and machine learning to monitor plant growth, predict yields, detect diseases, and understand precisely how nutrients, environment and light are affecting plant growth. This system will help indoor producers attain higher yields, precise quality control, and hyper-efficient production.

#### Ag-Analytics

Improving agriculture forecasting and conservation practices

### aka.ms/ai4egrantees

# ML stuff AI for Earth builds:

Using ML to help conservation scientists spend less time clicking stuff, and more time doing conservation.

#### Accelerating *camera trap* surveys

github.com/microsoft/cameratraps

Accelerating *aerial* wildlife surveys github.com/microsoft/aerial\_wildlife\_detection github.com/microsoft/arcticseals

Accelerating land cover surveys aka.ms/landcovermapping

Accelerating acoustic wildlife surveys

github.com/microsoft/belugasounds github.com/microsoft/multi\_species\_bioacoustic\_classification

All the fun animal-related work in one place

aka.ms/biodiversitysurveys











# Why a Planetary Computer?



Environmental sustainability depends on huge geospatial data sets, especially satellite imagery and climate data.



Working with geospatial data is a pain unless you have a PhD in remote sensing.



Working with very large data is a pain unless you have a PhD in distributed computing.



The people at the front lines of conservation usually have neither of the above.

The Planetary Computer *platform* puts key environmental datasets alongside processing tools and a managed compute environment to lower the access barrier for sustainability practitioners.

Planetary Computer *applications* put that platform to work for environmental decision-making.

## **Planetary Computer Components**



Geospatial data (currently ~25PB)



Data querying and processing **APIs** 



Compute environment (aka "Hub") for analytic workflows



(Partner) applications that put all of the above to work for sustainability

## **Planetary Computer Data**

#### Remote sensing data

- Cy
- Landsat 4, 5, 7, 8
- Sentinel-1, -2, -3, -5P
- GOES-16, -17
- MODIS, NAIP, ASTER, HLS
- NASADEM, ALOS DEM, Copernicus DEM



#### Weather/climate data

• GFS, HRRR, ISD, GHE, TerraClimate, Daymet, CMIP6



#### Land cover data

• USGS GAP, Esri 10m, JRC Water, NLCD



#### **Biodiversity data**

• GBIF, NatureServe MoBI, USFS FIA

#### planetarycomputer.microsoft.com/catalog



### That gets us to a super-slick pile of files...

### **Planetary Computer APIs**



Spatiotemporal queries

("find me all the images that overlap with Wyoming in 2012")



Image processing APIs: e.g. resampling to new grids, blending images



That gets us to a super-slick pile of files that's easy to query...

## **Planetary Computer Hub**



#### JupyterLab front-end



Access to Planetary Computer Data and APIs, and to user data on Azure storage



Distributed processing (without having to know what "distributed processing" is)

planetarycomputer.microsoft.com/compute

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That gives us a super-slick pile of files that's easy to query, and the power to compute over it...

# Some key launch applications...



#### Land use and land cover assessment

Accelerating geospatial image analysis with cloud-based AI, in partnership with Development Seed



#### **Deforestation risk analysis**

Estimating at-risk areas in the Amazon, in partnership with Imazon and Fundo Vale







#### **Prioritizing carbon offset projects**

Leveraging climate and fire risk models to inform decisions about forest protection projects, in partnership with CarbonPlan

planetarycomputer.microsoft.com/applications



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