



PACE

A SEA OF DATA

THE PACE MISSION

SPC
SAR
SST

1
00:00:00,934 --> 00:00:04,537

Where we are today,
think of as the box of eight crayons,

2
00:00:04,904 --> 00:00:07,440

and you can do a lot of amazing things
with that.

3
00:00:07,774 --> 00:00:11,578

So the information content
for any singular

4
00:00:11,578 --> 00:00:14,314

instrument on PACE is way
more than we're used to.

5
00:00:14,748 --> 00:00:18,885

OCI is going to be the box of 96
or 128 crayons.

6
00:00:18,885 --> 00:00:22,622

And so suddenly the tools you have at
your fingertips will fill

7
00:00:22,622 --> 00:00:25,125

in all the gaps of color
that we could possibly want.

8
00:00:25,125 --> 00:00:30,063

This observatory is going to provide
global coverage every day.

9
00:00:30,463 --> 00:00:35,468

That is another scale of this total volume
that is really, really increasing

10
00:00:35,735 --> 00:00:38,705

the amount of information
we have to work with.

11

00:00:38,705 --> 00:00:41,674

[music]

12

00:00:41,741 --> 00:00:44,244

We know the atmosphere is changing.

13

00:00:44,244 --> 00:00:47,414

We know carbon
dioxide levels have increased.

14

00:00:47,881 --> 00:00:50,350

We know that has warmed our atmosphere.

15

00:00:50,350 --> 00:00:52,719

Circulation patterns are changing.

16

00:00:53,253 --> 00:00:55,755

Places are warmer than they used to be.

17

00:00:56,189 --> 00:01:00,026

The deeper dive
we take into the relationships

18

00:01:00,026 --> 00:01:02,796

between land, ocean and atmosphere,

19

00:01:03,063 --> 00:01:05,799

the more we realize we don't know
and we need to learn.

20

00:01:06,266 --> 00:01:09,569

NASA is preparing to take that deeper dive
with the Plankton,

21

00:01:09,569 --> 00:01:13,173

Aerosol, Cloud, ocean Ecosystem
mission, or PACE.

22

00:01:13,673 --> 00:01:15,675

The PACE mission
and its suite of instruments

23

00:01:15,675 --> 00:01:19,212

will gather new data
on these interconnected Earth systems.

24

00:01:21,347 --> 00:01:24,250

The exchange of carbon
between the oceans, land and atmosphere.

25

00:01:24,851 --> 00:01:29,055

The impacts of atmospheric particles
on marine communities of phytoplankton.

26

00:01:29,422 --> 00:01:32,592

The changes these communities
are experiencing in a warmer Earth.

27

00:01:33,326 --> 00:01:36,996

Reducing the uncertainty of aerosols
and scientific climate models.

28

00:01:37,497 --> 00:01:40,934

PACE will improve our understanding
of these complex connections

29

00:01:41,134 --> 00:01:45,105

and how these systems are affected
in a changing climate.

30

00:01:45,105 --> 00:01:47,140

[music]

31

00:01:47,140 --> 00:01:51,544

The color of the oceans can tell us a lot
about our changing Earth systems,

32

00:01:51,544 --> 00:01:54,514

but there's much more to it
than just what the eye can see.

33

00:01:54,781 --> 00:01:58,418

And so PACE carries
the Ocean Color Instrument, or OCI,

34

00:01:58,418 --> 00:02:01,754

to continuously measure the interaction
of sunlight with substances

35

00:02:01,754 --> 00:02:05,959

in seawater, such as the green
photosynthetic pigment chlorophyll-a.

36

00:02:06,726 --> 00:02:07,527

We're very good

37

00:02:07,527 --> 00:02:11,297

today at saying there's a lot of green,
meaning there are a lot of plants.

38

00:02:11,297 --> 00:02:15,735

Where we want to go with OCI is
what kind of plant is actually there.

39

00:02:15,735 --> 00:02:18,738

And so by looking at more color,
you can actually start

40

00:02:18,738 --> 00:02:21,841

getting the subtleties
of this green versus

41

00:02:21,841 --> 00:02:23,409

the slightly different shade of green

42

00:02:23,409 --> 00:02:26,613

and then relate that to the composition
of what you're looking at.

43

00:02:27,046 --> 00:02:30,350

To measure very subtle differences
in shades of any color,

44

00:02:30,350 --> 00:02:33,920

OCI needs to measure light at much finer
wavelength resolutions

45

00:02:33,920 --> 00:02:36,523

than any other NASA sensor.

46

00:02:37,123 --> 00:02:39,092

From the sea to sky,

47

00:02:39,092 --> 00:02:42,795

PACE's other two instruments
are multiangle polarimeters,

48

00:02:42,795 --> 00:02:46,299

one hyperspectral
and the other hyperangular.

49

00:02:46,299 --> 00:02:50,470

Together, they'll take on aerosols, tiny
airborne particles, and clouds,

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00:02:50,770 --> 00:02:54,240

both of which change how
sunlight interacts with the atmosphere.

51

00:02:54,240 --> 00:03:00,413

So by those two polarimeters
keeping their eyes on our home planet

52

00:03:00,413 --> 00:03:03,783

all of the time, because they're making
measurements on global scales,

53

00:03:03,783 --> 00:03:08,288
we'll have a much better sense of general
evolving

54
00:03:08,288 --> 00:03:12,625
air quality on multiple local,
regional and global scales.

55
00:03:13,026 --> 00:03:16,496
With very few exceptions,
we not only make these data available

56
00:03:16,496 --> 00:03:21,434
in rapid semi-real time,
but we've developed tools

57
00:03:21,434 --> 00:03:25,872
that are open source that allow anybody
who wishes of accessing these data

58
00:03:25,872 --> 00:03:27,774
and coming to their own conclusions.

59
00:03:28,675 --> 00:03:29,943
The data from PACE will help

60
00:03:29,943 --> 00:03:34,080
scientists reveal complex relationships
that connect the atmosphere, ocean

61
00:03:34,080 --> 00:03:38,051
and land in ways that help explain changes
we see in our own lives