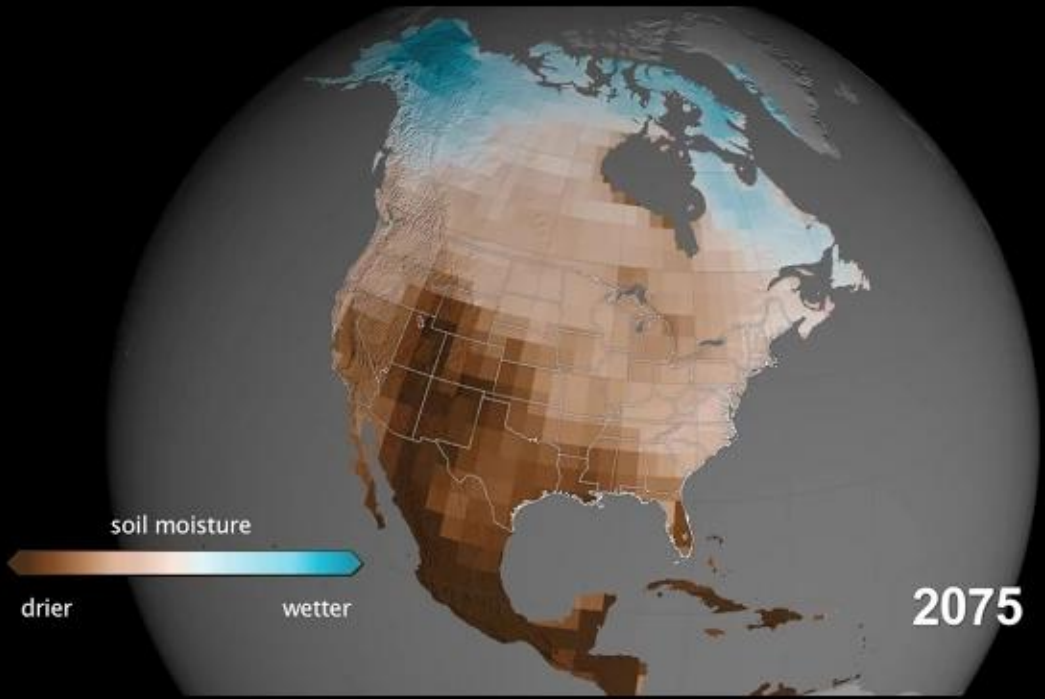
soil moisture
drier
wetter
2075

1
00:00:00,010 --> 00:00:04,030
Narrator: A new NASA study predicts that by the end of the 21st Century,

2
00:00:04,050 --> 00:00:08,090
the American Southwest and Great Plains are likely to experience

3
00:00:08,110 --> 00:00:12,090
longer and more severe droughts than at any other time

4
00:00:12,110 --> 00:00:16,140
in the last thousand years.

5
00:00:16,160 --> 00:00:20,160
Cook: So recent droughts like the ongoing drought in California or in the Southwest, or even

6
00:00:20,180 --> 00:00:24,180
historical droughts like the dustbowl in the 1930s. These are naturally-occurring droughts that

7
00:00:24,200 --> 00:00:28,280
typically last several years or sometimes almost a decade. In our projections what we're seeing

8
00:00:28,300 --> 00:00:32,310
is that with climate change, many of these types of droughts will likely last for

9
00:00:32,330 --> 00:00:36,320
20, 30, sometimes even 40 years. Even exceeding the duration of

10
00:00:36,340 --> 00:00:40,360
the long-term intense mega-droughts that characterized the really arid

11
00:00:40,380 --> 00:00:44,450
time period known as the Medieval Climate Anomaly.

12
00:00:44,470 --> 00:00:48,460
Narrator: So how can we peer into the planet’s future? Researchers combined natural

13
00:00:48,480 --> 00:00:52,560

harnessed the processing capabilities of powerful supercomputers.

14
00:00:52,580 --> 00:00:56,600
The scientists looked at a thousand years of tree ring data

15
00:00:56,620 --> 00:01:00,660
and compared those records with soil moisture data from

16
00:01:00,680 --> 00:01:04,710
17 different climate models, in order to extend this information into the future.

17
00:01:04,730 --> 00:01:08,720
The models all show a drier world thanks to increased temperatures

18
00:01:08,740 --> 00:01:12,730
from human induced climate change.

19
00:01:12,750 --> 00:01:16,770
Cook: These computer simulations, these climate models, really represent our best understand of

20
00:01:16,790 --> 00:01:20,820
the physics and the workings of the climate system. They're tested extensively against

21
00:01:20,840 --> 00:01:24,900
observations, and at the end of the day if we want to investigate future climate,

22
00:01:24,920 --> 00:01:28,970
they're really the only tool that we have to use.

23
00:01:28,990 --> 00:01:32,990
Narrator: How bad these droughts are likely to get has a lot to do with how much greenhouse gas emissions

24
00:01:33,010 --> 00:01:37,020
humans generate in coming years. Scientists looked at two different possibilities.

25
00:01:37,040 --> 00:01:41,070
First, a “business as usual” scenario where world-wide

26
00:01:41,090 --> 00:01:45,100
greenhouse gas emissions continue on their current course.

27
00:01:45,120 --> 00:01:49,120
In this case the future risk of lengthy droughts rises to 80%.

28
00:01:49,140 --> 00:01:53,170
lternatively, if the world were to take aggressive actions to reduce

29
00:01:53,190 --> 00:01:57,190
emissions, the models still show drying, but the trends will be less severe.

30
00:01:57,210 --> 00:02:01,220
In either scenario, droughts could

31
00:02:01,240 --> 00:02:05,250
potentially have major impacts in a region already facing water management concerns.

32
00:02:05,270 --> 00:02:09,310
Cook: These droughts really represent events that no

33
00:02:09,330 --> 00:02:13,320
in the history of the United States has ever had to deal with.

34
00:02:13,340 --> 00:02:17,340
And so even in the modern era droughts such as the ongoing droughts in California

35
00:02:17,360 --> 00:02:21,420
and the Southwest, these normal droughts act as major stresses

36
00:02:21,440 --> 00:02:25,430
on resources in the region, so we expect with these much longer droughts, it's going to be

37
00:02:25,450 --> 00:02:29,490
even more impactful and cause even more problems for agriculture