
From
SPACE
it's just
ONE
PLANET

1
00:00:05,829 --> 00:00:03,350
the ocean the atmosphere

2
00:00:07,829 --> 00:00:05,839
the eyes the land they all interact this

3
00:00:09,190 --> 00:00:07,839
is this big complex machine that we're

4
00:00:11,430 --> 00:00:09,200
trying to understand

5
00:00:14,230 --> 00:00:11,440
my name is severin phonier and i'm

6
00:00:17,510 --> 00:00:14,240
observing our changing oceans from space

7
00:00:19,510 --> 00:00:17,520
specifically i use measurements of the

8
00:00:20,950 --> 00:00:19,520
height of the ocean the temperature and

9
00:00:23,269 --> 00:00:20,960
the salinity of the ocean

10
00:00:25,830 --> 00:00:23,279
to better understand how the ocean is

11
00:00:26,470 --> 00:00:25,840
moving and how the currents are changing

12
00:00:28,070 --> 00:00:26,480
in time

13
00:00:30,550 --> 00:00:28,080

thanks to satellites we can have this

14
00:00:32,950 --> 00:00:30,560
big picture so this is the sentinel 6

15
00:00:34,630 --> 00:00:32,960
satellite the sentinel 6 is going to

16
00:00:36,310 --> 00:00:34,640
measure the height of the ocean so we've

17
00:00:37,990 --> 00:00:36,320
been measuring the height of the ocean

18
00:00:40,310 --> 00:00:38,000
since the beginning of the 90s

19
00:00:41,670 --> 00:00:40,320
and sentinel 6 is going to allow us to

20
00:00:43,910 --> 00:00:41,680
continue that record

21
00:00:46,069 --> 00:00:43,920
the satellite is actually emitting a

22
00:00:48,229 --> 00:00:46,079
signal and by measuring

23
00:00:49,110 --> 00:00:48,239
the time that it takes for the signal to

24
00:00:50,869 --> 00:00:49,120
bounce back

25
00:00:53,029 --> 00:00:50,879
to the satellite this is going to give

26
00:00:55,110 --> 00:00:53,039
us the measurement of the height of the

27
00:00:57,189 --> 00:00:55,120
ocean so the satellite is uh

28
00:00:59,510 --> 00:00:57,199
going all over the globe in about 10

29
00:01:02,790 --> 00:00:59,520
days we can use this data

30
00:01:04,950 --> 00:01:02,800
to monitor either the sea level rise or

31
00:01:07,109 --> 00:01:04,960
el nino events it doesn't matter where

32
00:01:07,750 --> 00:01:07,119
you live everyone is impacted by the

33
00:01:09,910 --> 00:01:07,760
ocean

34
00:01:11,109 --> 00:01:09,920
the earth in general is very fascinating

35
00:01:13,990 --> 00:01:11,119
trying to understand

36
00:01:16,070 --> 00:01:14,000
how the earth system works and also

37
00:01:16,550 --> 00:01:16,080
hopefully if my work can have an impact

38
00:01:21,190 --> 00:01:16,560

on

39
00:01:23,670 --> 00:01:21,200
me

40
00:01:24,950 --> 00:01:23,680
so i grew up in france and i did all my

41
00:01:27,429 --> 00:01:24,960
studies in france

42
00:01:28,310 --> 00:01:27,439
i mean science is is international so

43
00:01:31,270 --> 00:01:28,320
scientists

44
00:01:32,710 --> 00:01:31,280
around the world are using this data to

45
00:01:35,850 --> 00:01:32,720
help people

46
00:01:38,950 --> 00:01:35,860
from space it's just one planet

47
00:01:41,350 --> 00:01:38,960
[Music]

48
00:01:43,590 --> 00:01:41,360
welcome everyone i'm marina jericho with

49
00:01:45,030 --> 00:01:43,600
nasa's jet propulsion laboratory in

50
00:01:47,350 --> 00:01:45,040
southern california

51
00:01:48,310 --> 00:01:47,360
you may know nasa best for exploring

52
00:01:50,789 --> 00:01:48,320
other planets

53
00:01:52,789 --> 00:01:50,799
but we are also keeping a close eye on

54
00:01:54,870 --> 00:01:52,799
our own planet earth

55
00:01:56,469 --> 00:01:54,880
nasa is about to launch the u.s and

56
00:01:59,030 --> 00:01:56,479
european sentinel 6

57
00:02:00,310 --> 00:01:59,040
michael frylick satellite this satellite

58
00:02:03,350 --> 00:02:00,320
aims to collect the most

59
00:02:04,950 --> 00:02:03,360
accurate data yet on sea level and how

60
00:02:07,190 --> 00:02:04,960
it changes over time

61
00:02:08,070 --> 00:02:07,200
jpl manages the sentinel 6 michael

62
00:02:11,750 --> 00:02:08,080
freilick mission

63
00:02:12,390 --> 00:02:11,760

for nasa nasa jpl oceanographer severin

64
00:02:14,390 --> 00:02:12,400
fournier

65
00:02:16,630 --> 00:02:14,400
is a scientist on this mission who will

66
00:02:18,869 --> 00:02:16,640
be observing the data that comes down

67
00:02:20,070 --> 00:02:18,879
and continues to analyze sea level

68
00:02:22,869 --> 00:02:20,080
changes and the

69
00:02:24,390 --> 00:02:22,879
impact to each and every one of us who

70
00:02:26,550 --> 00:02:24,400
live here on earth

71
00:02:27,990 --> 00:02:26,560
she joins us live today to answer some

72
00:02:29,589 --> 00:02:28,000
of your questions

73
00:02:31,509 --> 00:02:29,599
if you have any questions you'd like to

74
00:02:32,229 --> 00:02:31,519
ask you can leave them right here in the

75
00:02:34,309 --> 00:02:32,239
comments

76
00:02:35,430 --> 00:02:34,319
or post them to social media with the

77
00:02:38,070 --> 00:02:35,440
hashtag

78
00:02:40,869 --> 00:02:38,080
seeing the seas thank you so much for

79
00:02:43,190 --> 00:02:40,879
joining us here today severine

80
00:02:45,670 --> 00:02:43,200
hi marina i'm happy to be here and happy

81
00:02:48,070 --> 00:02:45,680
to answer some questions

82
00:02:50,070 --> 00:02:48,080
great so let's get started you are

83
00:02:50,790 --> 00:02:50,080
really excited that sentinel 6 will

84
00:02:53,030 --> 00:02:50,800
continue in

85
00:02:53,830 --> 00:02:53,040
gathering this data on our oceans for

86
00:02:56,869 --> 00:02:53,840
another

87
00:02:59,190 --> 00:02:56,879
10 years why is it so important to have

88
00:03:01,030 --> 00:02:59,200

that continuity

89
00:03:02,869 --> 00:03:01,040
so i think what is very exciting and

90
00:03:04,949 --> 00:03:02,879
important about about sentinel 6 it's

91
00:03:06,710 --> 00:03:04,959
really the continuation

92
00:03:08,229 --> 00:03:06,720
of the measurements of sea surface

93
00:03:10,390 --> 00:03:08,239
height so we've been measuring

94
00:03:12,869 --> 00:03:10,400
the height of the ocean for about 30

95
00:03:15,270 --> 00:03:12,879
years now since the beginning of the 90s

96
00:03:17,270 --> 00:03:15,280
and um and sentinel 6 is going to allow

97
00:03:18,470 --> 00:03:17,280
us to measure that for another 10 years

98
00:03:20,550 --> 00:03:18,480
and this is really important because

99
00:03:22,070 --> 00:03:20,560
we're monitoring the sea level for

100
00:03:24,149 --> 00:03:22,080
example

101
00:03:25,589 --> 00:03:24,159
we've seen for the past decades that sea

102
00:03:27,350 --> 00:03:25,599
level is rising

103
00:03:29,110 --> 00:03:27,360
for about three millimeters a year and

104
00:03:32,149 --> 00:03:29,120
this trend is accelerating

105
00:03:34,789 --> 00:03:32,159
and we really need to keep monitoring

106
00:03:36,390 --> 00:03:34,799
that trend and that acceleration and

107
00:03:38,470 --> 00:03:36,400
sentinel 6 is going to allow us to do

108
00:03:39,750 --> 00:03:38,480
that but there are also other phenomena

109
00:03:42,149 --> 00:03:39,760
that we need to monitor

110
00:03:43,830 --> 00:03:42,159
such as el nino and hurricane

111
00:03:47,509 --> 00:03:43,840
intensification for example and

112
00:03:49,830 --> 00:03:47,519
and sentinel 6 will help with all that

113
00:03:50,789 --> 00:03:49,840

and adding another 10 years will also

114
00:03:54,070 --> 00:03:50,799
enable us to

115
00:03:56,070 --> 00:03:54,080
learn how we need to react in the future

116
00:03:58,309 --> 00:03:56,080
yeah definitely being prepared and

117
00:04:01,190 --> 00:03:58,319
forecast or all that yes

118
00:04:03,589 --> 00:04:01,200
important you were born in france how

119
00:04:05,509 --> 00:04:03,599
did you end up working at nasa did you

120
00:04:07,429 --> 00:04:05,519
always have a passion for earth science

121
00:04:10,789 --> 00:04:07,439
at a young age

122
00:04:13,589 --> 00:04:10,799
um not really um but i was

123
00:04:14,070 --> 00:04:13,599
i think i've been always curious and i

124
00:04:16,069 --> 00:04:14,080
was

125
00:04:17,909 --> 00:04:16,079
just good at math and physics i guess so

126
00:04:20,229 --> 00:04:17,919
i went to college and i studied uh

127
00:04:21,270 --> 00:04:20,239
physics and then when it was time to

128
00:04:24,310 --> 00:04:21,280
choose an option

129
00:04:27,510 --> 00:04:24,320
um oceanography seemed interesting

130
00:04:27,990 --> 00:04:27,520
and and different and kind of studying

131
00:04:30,150 --> 00:04:28,000
the ocean

132
00:04:31,909 --> 00:04:30,160
seemed a bit romantic so i picked that

133
00:04:32,629 --> 00:04:31,919
and then i realized that i was really

134
00:04:35,670 --> 00:04:32,639
interested

135
00:04:38,870 --> 00:04:35,680
in the observation side of things

136
00:04:40,469 --> 00:04:38,880
um like especially from from space uh it

137
00:04:42,230 --> 00:04:40,479
seemed fascinating that we could study

138
00:04:43,670 --> 00:04:42,240

the ocean from hundreds of kilometers

139
00:04:46,629 --> 00:04:43,680
above the earth

140
00:04:47,510 --> 00:04:46,639
um so i i then studied remote sensing

141
00:04:50,150 --> 00:04:47,520
and

142
00:04:50,629 --> 00:04:50,160
i did a phd trying to combine these two

143
00:04:53,749 --> 00:04:50,639
so i

144
00:04:56,550 --> 00:04:53,759
did oceanography by using satellite data

145
00:04:57,430 --> 00:04:56,560
i studied like river plumes and how they

146
00:04:59,030 --> 00:04:57,440
are impacting

147
00:05:00,790 --> 00:04:59,040
the fresh water discharge from the

148
00:05:01,990 --> 00:05:00,800
rivers how it's impacting the coastal

149
00:05:05,749 --> 00:05:02,000
ocean

150
00:05:08,230 --> 00:05:05,759
using satellite data and during my phd

151
00:05:10,390 --> 00:05:08,240
i was working with researchers from

152
00:05:13,110 --> 00:05:10,400
different countries especially the us

153
00:05:14,469 --> 00:05:13,120
and uh so i wanted to go abroad and and

154
00:05:15,510 --> 00:05:14,479
live somewhere else and have another

155
00:05:17,590 --> 00:05:15,520
experience

156
00:05:18,870 --> 00:05:17,600
so i got a fellowship to come work at

157
00:05:21,350 --> 00:05:18,880
nasa at jpl

158
00:05:23,110 --> 00:05:21,360
for a couple of years and after that i

159
00:05:25,430 --> 00:05:23,120
stayed because i find jpl

160
00:05:26,310 --> 00:05:25,440
to be a very fascinating place to to

161
00:05:28,629 --> 00:05:26,320
work at

162
00:05:30,230 --> 00:05:28,639
and it's very unique because i can do

163
00:05:31,189 --> 00:05:30,240

science and at the same time being

164
00:05:33,430 --> 00:05:31,199
involved in

165
00:05:35,990 --> 00:05:33,440
in satellite missions from the ground up

166
00:05:37,990 --> 00:05:36,000
like sentinel 6.

167
00:05:40,070 --> 00:05:38,000
that is amazing it offers you the best

168
00:05:41,749 --> 00:05:40,080
of both worlds

169
00:05:43,670 --> 00:05:41,759
now you're going to take this data

170
00:05:46,790 --> 00:05:43,680
severine from sentinel 6 and

171
00:05:48,950 --> 00:05:46,800
help scientists across the globe use it

172
00:05:50,150 --> 00:05:48,960
to learn about sea level and the changes

173
00:05:51,830 --> 00:05:50,160
that are happening

174
00:05:54,390 --> 00:05:51,840
what do you find most rewarding about

175
00:05:56,390 --> 00:05:54,400
the work that you do

176
00:05:57,510 --> 00:05:56,400
so i really like what i do because it's

177
00:05:59,749 --> 00:05:57,520
very interesting

178
00:06:00,710 --> 00:05:59,759
so trying to understand how the earth

179
00:06:03,909 --> 00:06:00,720
system works

180
00:06:05,990 --> 00:06:03,919
uh how the the ocean atmosphere the land

181
00:06:07,830 --> 00:06:06,000
the eyes they all interact together

182
00:06:09,350 --> 00:06:07,840
it's fascinating and there is so much

183
00:06:12,629 --> 00:06:09,360
more to discover

184
00:06:14,629 --> 00:06:12,639
um that's it's really exciting and

185
00:06:16,950 --> 00:06:14,639
i hope that my work also can have an

186
00:06:17,270 --> 00:06:16,960
impact on people's life and that that is

187
00:06:20,629 --> 00:06:17,280
the

188
00:06:22,230 --> 00:06:20,639

most rewarding thing for me

189
00:06:24,710 --> 00:06:22,240
wonderful well now we're going to go to

190
00:06:27,350 --> 00:06:24,720
some social media questions

191
00:06:27,990 --> 00:06:27,360
and related to that attina on facebook

192
00:06:31,270 --> 00:06:28,000
asks

193
00:06:35,350 --> 00:06:31,280
what are the consequences of rising seas

194
00:06:37,909 --> 00:06:35,360
it is is it a natural phenomenon

195
00:06:40,070 --> 00:06:37,919
um so they're they're going to be there

196
00:06:41,909 --> 00:06:40,080
there are already consequences of a sea

197
00:06:42,790 --> 00:06:41,919
level rise especially for the coastal

198
00:06:44,550 --> 00:06:42,800
communities

199
00:06:46,230 --> 00:06:44,560
uh and there are a lot of people living

200
00:06:49,270 --> 00:06:46,240
on living on the coast so

201
00:06:51,110 --> 00:06:49,280
sea seas are kind of threatening um

202
00:06:52,390 --> 00:06:51,120
all the everything that is built on the

203
00:06:54,870 --> 00:06:52,400
coast um

204
00:06:57,110 --> 00:06:54,880
including businesses in people's house

205
00:06:58,230 --> 00:06:57,120
um but also even further inland

206
00:07:00,070 --> 00:06:58,240
there are people that are going to be

207
00:07:03,189 --> 00:07:00,080
impacted by that because during like for

208
00:07:05,589 --> 00:07:03,199
example hurricanes and storms

209
00:07:06,629 --> 00:07:05,599
water is reaching more and more inland

210
00:07:09,670 --> 00:07:06,639
and people are going to

211
00:07:11,350 --> 00:07:09,680
have going to see flooding events when

212
00:07:14,070 --> 00:07:11,360
decades ago there were there were no

213
00:07:16,629 --> 00:07:14,080

water coming in during during storms

214
00:07:17,909 --> 00:07:16,639
um and also they they're not only for

215
00:07:20,950 --> 00:07:17,919
humans they're also

216
00:07:23,749 --> 00:07:20,960
impact on uh on ecosystems and uh

217
00:07:25,350 --> 00:07:23,759
there's a lot of erosion um on on the

218
00:07:26,629 --> 00:07:25,360
beach that are changing the natural

219
00:07:29,189 --> 00:07:26,639
habitat for uh for

220
00:07:29,830 --> 00:07:29,199
for many species and also infiltration

221
00:07:35,430 --> 00:07:29,840
of

222
00:07:36,469 --> 00:07:35,440
in the water reservoirs and for drinking

223
00:07:38,309 --> 00:07:36,479
water and even for

224
00:07:40,230 --> 00:07:38,319
agriculture and all that are going to

225
00:07:42,469 --> 00:07:40,240
have drastic uh

226
00:07:47,110 --> 00:07:42,479
impact on on people lives everywhere not

227
00:07:51,990 --> 00:07:49,430
renee on facebook living in savannah

228
00:07:54,629 --> 00:07:52,000
georgia asks how much a year

229
00:07:55,189 --> 00:07:54,639
are you seeing rise in the oceans are

230
00:07:59,350 --> 00:07:55,199
you seeing

231
00:08:01,510 --> 00:07:59,360
a bigger rise in any specific area

232
00:08:03,430 --> 00:08:01,520
yes so when we see when we say that

233
00:08:06,950 --> 00:08:03,440
there is about uh three millimeters

234
00:08:09,749 --> 00:08:06,960
uh rise uh per year on

235
00:08:12,150 --> 00:08:09,759
it's on average uh globally but this is

236
00:08:14,869 --> 00:08:12,160
going to change depend

237
00:08:16,230 --> 00:08:14,879
depending on on i mean in different

238
00:08:18,150 --> 00:08:16,240

regions we're gonna see

239
00:08:20,070 --> 00:08:18,160
some some places sea level is gonna is

240
00:08:21,270 --> 00:08:20,080
gonna drop but it's gonna rise much more

241
00:08:23,670 --> 00:08:21,280
on other places

242
00:08:24,950 --> 00:08:23,680
uh you can reach 10 millimeters in in

243
00:08:26,469 --> 00:08:24,960
some places

244
00:08:27,830 --> 00:08:26,479
in the pacific ocean there there are

245
00:08:28,390 --> 00:08:27,840
some islands that are going to be

246
00:08:31,110 --> 00:08:28,400
threatened

247
00:08:33,350 --> 00:08:31,120
much more because the sea level is going

248
00:08:36,310 --> 00:08:33,360
is rising much more in these regions

249
00:08:39,509 --> 00:08:36,320
than than others so it's not it's not

250
00:08:41,909 --> 00:08:39,519
equally the same everywhere definitely

251
00:08:42,949 --> 00:08:41,919
and darren on facebook asks along the

252
00:08:44,790 --> 00:08:42,959
same lines

253
00:08:46,710 --> 00:08:44,800
what are some of the less obvious

254
00:08:48,150 --> 00:08:46,720
effects of rising oceans

255
00:08:51,030 --> 00:08:48,160
i'm thinking about things like

256
00:08:54,230 --> 00:08:51,040
salination of near coastal aquifers

257
00:08:56,070 --> 00:08:54,240
and other fresh water sources yeah

258
00:08:58,470 --> 00:08:56,080
definitely so i was i was

259
00:08:59,269 --> 00:08:58,480
saying that a little bit earlier um yeah

260
00:09:01,750 --> 00:08:59,279
so

261
00:09:03,430 --> 00:09:01,760
with sea level rising there is going to

262
00:09:05,670 --> 00:09:03,440
be intrusion of salt water

263
00:09:07,590 --> 00:09:05,680

in in the aquifers and in in the

264
00:09:09,110 --> 00:09:07,600
reservoirs of drinking water

265
00:09:11,670 --> 00:09:09,120
so that's going to have an impact on

266
00:09:14,470 --> 00:09:11,680
people even living further inland

267
00:09:16,710 --> 00:09:14,480
and thinking about agriculture also

268
00:09:18,389 --> 00:09:16,720
there's going to be

269
00:09:20,230 --> 00:09:18,399
crops that are going to be impacted by

270
00:09:20,710 --> 00:09:20,240
salt water when they actually cannot

271
00:09:23,990 --> 00:09:20,720
really

272
00:09:25,590 --> 00:09:24,000
deal with salt water so agriculture can

273
00:09:29,990 --> 00:09:25,600
can be impacted by that too

274
00:09:32,550 --> 00:09:30,000
yeah and cygnus on facebook

275
00:09:34,790 --> 00:09:32,560
asks a question in french so i will ask

276
00:09:36,310 --> 00:09:34,800
the question as well in english and if

277
00:09:46,790 --> 00:09:36,320
you could answer both severine that

278
00:09:50,310 --> 00:09:49,509
followed by here we have truly measured

279
00:09:53,670 --> 00:09:50,320
a rise

280
00:09:59,330 --> 00:09:53,680
in sea level is this accurate or is it

281
00:09:59,340 --> 00:10:02,829
[Music]

282
00:10:02,839 --> 00:10:09,610
um

283
00:10:09,620 --> 00:10:44,790
[Music]

284
00:10:49,750 --> 00:10:47,910
so yes uh we've really measured uh an

285
00:10:51,670 --> 00:10:49,760
increase in in a sea level a rise in the

286
00:10:55,110 --> 00:10:51,680
sea level for the past uh

287
00:10:57,110 --> 00:10:55,120
almost 30 years now from satellite uh

288
00:10:58,310 --> 00:10:57,120

this trend of five of three millimeters

289
00:11:00,550 --> 00:10:58,320
per year uh

290
00:11:02,470 --> 00:11:00,560
is uh is real and has been has been

291
00:11:03,269 --> 00:11:02,480
measured and we've even seen an

292
00:11:06,710 --> 00:11:03,279
acceleration

293
00:11:08,710 --> 00:11:06,720
uh recently in the five last years um

294
00:11:10,790 --> 00:11:08,720
and we'll predict predicting that uh

295
00:11:13,190 --> 00:11:10,800
this this trend is going to continue and

296
00:11:15,430 --> 00:11:13,200
might accelerate uh even more we don't

297
00:11:17,910 --> 00:11:15,440
know that so we need sentinel 6 for that

298
00:11:18,470 --> 00:11:17,920
but the data shows that yes we we've

299
00:11:21,509 --> 00:11:18,480
seen

300
00:11:25,190 --> 00:11:24,230
and this is the first esa nasa joint

301
00:11:27,030 --> 00:11:25,200
earth science

302
00:11:29,430 --> 00:11:27,040
mission proving your comment that

303
00:11:31,350 --> 00:11:29,440
science is truly international

304
00:11:33,670 --> 00:11:31,360
how do you feel about this world science

305
00:11:35,430 --> 00:11:33,680
collaboration

306
00:11:37,670 --> 00:11:35,440
yeah so i think that in science

307
00:11:39,110 --> 00:11:37,680
international collaboration is just how

308
00:11:41,269 --> 00:11:39,120
it should be

309
00:11:43,030 --> 00:11:41,279
there should be no other interest but

310
00:11:45,030 --> 00:11:43,040
the human aspect interest

311
00:11:47,269 --> 00:11:45,040
and actually sentinel 6 is a great

312
00:11:49,430 --> 00:11:47,279
example for that and

313
00:11:51,110 --> 00:11:49,440

missions that were that were there

314
00:11:53,910 --> 00:11:51,120
previously in altimetry

315
00:11:55,350 --> 00:11:53,920
uh since topex poseidon in 19 launched

316
00:11:58,230 --> 00:11:55,360
in 1992

317
00:12:00,150 --> 00:11:58,240
um it was a collaboration starting

318
00:12:02,150 --> 00:12:00,160
between france and the u.s with topex

319
00:12:02,629 --> 00:12:02,160
poseidon and then jason one two and

320
00:12:05,190 --> 00:12:02,639
three

321
00:12:06,230 --> 00:12:05,200
it became a collaboration between the us

322
00:12:08,470 --> 00:12:06,240
and europe

323
00:12:10,069 --> 00:12:08,480
so it's been 30 years that we are

324
00:12:12,949 --> 00:12:10,079
collaborating internationally

325
00:12:14,389 --> 00:12:12,959
and uh it's a it's successful it works

326
00:12:17,750 --> 00:12:14,399
and this is how it's

327
00:12:18,710 --> 00:12:17,760
supposed to be yeah well we all live on

328
00:12:20,949 --> 00:12:18,720
this planet

329
00:12:22,949 --> 00:12:20,959
and we have to all protect our oceans

330
00:12:24,470 --> 00:12:22,959
and that is a wonderful way to look at

331
00:12:26,310 --> 00:12:24,480
it and i'm so glad that everyone was

332
00:12:27,110 --> 00:12:26,320
able to come together for this mission

333
00:12:29,670 --> 00:12:27,120
severine

334
00:12:30,710 --> 00:12:29,680
back to our facebook questions andrew is

335
00:12:33,190 --> 00:12:30,720
asking

336
00:12:34,629 --> 00:12:33,200
what is the biggest discovery about our

337
00:12:38,629 --> 00:12:34,639
oceans in the past

338
00:12:42,069 --> 00:12:38,639

10 years and i'm sorry it's andre

339
00:12:45,750 --> 00:12:42,079
oh wow that's that's a big question

340
00:12:47,590 --> 00:12:45,760
um i'm not sure there is there's so much

341
00:12:49,030 --> 00:12:47,600
there there's there's so much about the

342
00:12:51,110 --> 00:12:49,040
the oceans uh

343
00:12:52,870 --> 00:12:51,120
either it's in in the physics of the

344
00:12:54,949 --> 00:12:52,880
ocean or in biology

345
00:12:56,230 --> 00:12:54,959
i would say uh sea level rise is

346
00:12:57,990 --> 00:12:56,240
actually i mean it hasn't been

347
00:12:59,030 --> 00:12:58,000
discovered in the past 10 years but it's

348
00:13:02,230 --> 00:12:59,040
something that

349
00:13:06,870 --> 00:13:02,240
is really affecting people uh like

350
00:13:10,230 --> 00:13:06,880
right now um i don't know if

351
00:13:12,069 --> 00:13:10,240
that's a very broad question

352
00:13:13,750 --> 00:13:12,079
um i don't really know we've we've

353
00:13:15,750 --> 00:13:13,760
monitored el nino

354
00:13:16,949 --> 00:13:15,760
so recently we had a big el nino we

355
00:13:20,150 --> 00:13:16,959
learned a lot more

356
00:13:20,949 --> 00:13:20,160
about about this event our coastal

357
00:13:23,110 --> 00:13:20,959
oceans

358
00:13:24,150 --> 00:13:23,120
we are learning things every day and

359
00:13:27,509 --> 00:13:24,160
there is so much

360
00:13:30,710 --> 00:13:29,110
yeah and you mentioned that sea surface

361
00:13:33,269 --> 00:13:30,720
height helps us better understand

362
00:13:35,590 --> 00:13:33,279
how and when global patterns like el

363
00:13:37,590 --> 00:13:35,600

nino and la nina will happen

364
00:13:39,509 --> 00:13:37,600
what are those patterns and how will

365
00:13:41,590 --> 00:13:39,519
sentinel 6 help forecast them more

366
00:13:45,189 --> 00:13:41,600
efficiently

367
00:13:46,790 --> 00:13:45,199
yeah so to simplify that um so normally

368
00:13:48,949 --> 00:13:46,800
in the in the pacific ocean there are

369
00:13:50,150 --> 00:13:48,959
winds blowing towards the west so

370
00:13:52,949 --> 00:13:50,160
towards asia

371
00:13:53,750 --> 00:13:52,959
it kind of pushes warm water uh one

372
00:13:56,230 --> 00:13:53,760
waters

373
00:13:57,509 --> 00:13:56,240
against the coast of australia and

374
00:13:59,670 --> 00:13:57,519
indonesia

375
00:14:01,430 --> 00:13:59,680
so you have this waters piling up there

376
00:14:03,430 --> 00:14:01,440
and when during an el nino event

377
00:14:05,430 --> 00:14:03,440
the winds are going to weaken so these

378
00:14:06,389 --> 00:14:05,440
waters are not pushed anymore these warm

379
00:14:09,110 --> 00:14:06,399
waters are going to

380
00:14:11,189 --> 00:14:09,120
move along the equator towards south

381
00:14:13,269 --> 00:14:11,199
america and central america

382
00:14:14,790 --> 00:14:13,279
and once these warm waters reach the

383
00:14:15,509 --> 00:14:14,800
coast of south america and central

384
00:14:16,790 --> 00:14:15,519
america

385
00:14:19,509 --> 00:14:16,800
they're going to have interaction with

386
00:14:21,750 --> 00:14:19,519
the atmosphere and it's going to cause a

387
00:14:24,150 --> 00:14:21,760
lot of precipitation for example

388
00:14:26,470 --> 00:14:24,160

in these in these regions leading to

389
00:14:27,670 --> 00:14:26,480
devastating flooding events

390
00:14:29,110 --> 00:14:27,680
also going to have an impact on

391
00:14:30,870 --> 00:14:29,120
fisheries in the coastal ocean i mean

392
00:14:33,269 --> 00:14:30,880
these warm waters are gonna

393
00:14:33,990 --> 00:14:33,279
are gonna change the conditions for for

394
00:14:35,509 --> 00:14:34,000
fish

395
00:14:37,189 --> 00:14:35,519
uh on the other side of the of the

396
00:14:39,829 --> 00:14:37,199
pacific ocean um

397
00:14:41,269 --> 00:14:39,839
now we have cold waters there and the

398
00:14:43,350 --> 00:14:41,279
dry air is gonna cause

399
00:14:44,470 --> 00:14:43,360
droughts in in australia and in

400
00:14:46,230 --> 00:14:44,480
indonesia

401
00:14:48,389 --> 00:14:46,240
uh that can have an impact on water

402
00:14:51,350 --> 00:14:48,399
resources and wildfires

403
00:14:53,030 --> 00:14:51,360
um and beyond that uh el nino has an

404
00:14:55,350 --> 00:14:53,040
impact on on the weather

405
00:14:57,030 --> 00:14:55,360
uh in other regions of the world even

406
00:14:59,910 --> 00:14:57,040
even in africa

407
00:15:00,870 --> 00:14:59,920
um so sentinel-6 can really help with

408
00:15:03,750 --> 00:15:00,880
all that because

409
00:15:06,710 --> 00:15:03,760
uh when the waters of the ocean are

410
00:15:08,629 --> 00:15:06,720
warming up the oceans tend to expand

411
00:15:10,470 --> 00:15:08,639
so the height of the ocean is going to

412
00:15:11,590 --> 00:15:10,480
is going to increase so sentinel-6 can

413
00:15:13,590 --> 00:15:11,600

see that

414
00:15:14,710 --> 00:15:13,600
and these waters that are moving along

415
00:15:17,110 --> 00:15:14,720
the equator

416
00:15:19,030 --> 00:15:17,120
uh for months before reaching the coast

417
00:15:20,710 --> 00:15:19,040
of south america since no sex will be

418
00:15:22,550 --> 00:15:20,720
able to track these waters

419
00:15:24,710 --> 00:15:22,560
and because it's month in advance that

420
00:15:26,870 --> 00:15:24,720
this transport of water is happening

421
00:15:27,990 --> 00:15:26,880
we can actually prepare and plan and

422
00:15:29,990 --> 00:15:28,000
sentinel 6 can

423
00:15:31,509 --> 00:15:30,000
can be really useful for that to prepare

424
00:15:35,110 --> 00:15:31,519
to all the devastating

425
00:15:36,470 --> 00:15:35,120
consequences of an el nino event

426
00:15:38,470 --> 00:15:36,480
and severine i know we've talked about

427
00:15:40,470 --> 00:15:38,480
this many times it's so important to

428
00:15:42,150 --> 00:15:40,480
have that lead time for organizations

429
00:15:42,710 --> 00:15:42,160
like noaa and the national weather

430
00:15:44,230 --> 00:15:42,720
service

431
00:15:46,310 --> 00:15:44,240
so that they're able to get those

432
00:15:48,470 --> 00:15:46,320
warnings out earlier to the people who

433
00:15:51,430 --> 00:15:48,480
live in those areas

434
00:15:52,629 --> 00:15:51,440
yeah definitely to be prepared yeah yes

435
00:15:55,509 --> 00:15:52,639
all right well sarah

436
00:15:58,150 --> 00:15:55,519
sharkey on facebook asks how accurate

437
00:16:02,150 --> 00:15:58,160
will this mission be

438
00:16:03,590 --> 00:16:02,160

uh so um along along the track

439
00:16:05,269 --> 00:16:03,600
of the satellite so the satellite is

440
00:16:07,590 --> 00:16:05,279
measuring uh sea level

441
00:16:09,189 --> 00:16:07,600
uh along the tracks when when he goes

442
00:16:12,550 --> 00:16:09,199
around around the globe

443
00:16:16,150 --> 00:16:12,560
um so the accuracy is about a

444
00:16:19,590 --> 00:16:16,160
centimeter um but then when we

445
00:16:21,350 --> 00:16:19,600
when we average this data over uh

446
00:16:23,990 --> 00:16:21,360
over a few days over the globe then

447
00:16:26,230 --> 00:16:24,000
we're gonna have a millimeters uh

448
00:16:27,350 --> 00:16:26,240
millimeter of accuracy uh so that's why

449
00:16:29,990 --> 00:16:27,360
we can actually uh

450
00:16:31,350 --> 00:16:30,000
predict this uh we can actually see this

451
00:16:33,509 --> 00:16:31,360
three millimeters per year

452
00:16:34,790 --> 00:16:33,519
um on average over the globe and

453
00:16:37,990 --> 00:16:34,800
actually sentinel six

454
00:16:40,230 --> 00:16:38,000
is a compared to the previous missions

455
00:16:41,030 --> 00:16:40,240
we are expecting an increase in the in

456
00:16:45,990 --> 00:16:41,040
the occur

457
00:16:50,230 --> 00:16:48,470
john on facebook asks are the sea levels

458
00:16:53,829 --> 00:16:50,240
really rising or are

459
00:17:00,310 --> 00:16:56,870
no sea level is really rising um

460
00:17:02,389 --> 00:17:00,320
so the main cause for that is uh

461
00:17:03,509 --> 00:17:02,399
is the warming of the ocean so as i was

462
00:17:05,429 --> 00:17:03,519
explaining when the

463
00:17:07,510 --> 00:17:05,439

when the waters are warming the ocean

464
00:17:09,189 --> 00:17:07,520
tend to expand so the volume of the

465
00:17:10,390 --> 00:17:09,199
ocean increases so the

466
00:17:12,470 --> 00:17:10,400
the height of the ocean is going to

467
00:17:14,230 --> 00:17:12,480
increase and there is also

468
00:17:16,470 --> 00:17:14,240
uh another cause which comes from a

469
00:17:18,470 --> 00:17:16,480
glacier and ice sheets that are melting

470
00:17:20,230 --> 00:17:18,480
so they're just adding more water to the

471
00:17:21,029 --> 00:17:20,240
ocean so the volume also is going to

472
00:17:22,309 --> 00:17:21,039
increase and

473
00:17:24,069 --> 00:17:22,319
the height of the ocean is going to

474
00:17:25,990 --> 00:17:24,079
increase there are some definitely

475
00:17:28,950 --> 00:17:26,000
regions of the world where the land

476
00:17:31,350 --> 00:17:28,960
is is is sinking uh due to for example

477
00:17:34,390 --> 00:17:31,360
pumping of water from the

478
00:17:38,230 --> 00:17:34,400
groundwater from the reservoirs um

479
00:17:39,430 --> 00:17:38,240
we definitely see that but the sea level

480
00:17:42,870 --> 00:17:39,440
is really rising and that's

481
00:17:46,150 --> 00:17:42,880
that's a a significant uh

482
00:17:48,710 --> 00:17:46,160
phenomena yeah yes

483
00:17:50,870 --> 00:17:48,720
and leslie on facebook asks how much

484
00:17:51,430 --> 00:17:50,880
improvement are you going to see in your

485
00:17:53,830 --> 00:17:51,440
work

486
00:17:55,510 --> 00:17:53,840
with the launch of sentinel 6 versus the

487
00:17:57,270 --> 00:17:55,520
existing satellites that are already

488
00:17:59,669 --> 00:17:57,280

there

489
00:18:02,390 --> 00:17:59,679
so actually i'm personally very excited

490
00:18:05,669 --> 00:18:02,400
about sentinel 6 because i'm

491
00:18:09,430 --> 00:18:05,679
most of my work is in coastal oceans

492
00:18:10,549 --> 00:18:09,440
and until now uh jason 3 and jason 2 and

493
00:18:12,710 --> 00:18:10,559
jason 1

494
00:18:13,990 --> 00:18:12,720
we had measurements on the coast some

495
00:18:17,110 --> 00:18:14,000
people were kind of trying

496
00:18:19,029 --> 00:18:17,120
to improve the data along the coast um

497
00:18:21,430 --> 00:18:19,039
but it was designed mostly for the open

498
00:18:24,789 --> 00:18:21,440
ocean and sentinel 6

499
00:18:26,230 --> 00:18:24,799
we are expecting a real uh a real

500
00:18:28,310 --> 00:18:26,240
increase in accuracy

501
00:18:29,430 --> 00:18:28,320
in the measurements of success height

502
00:18:31,430 --> 00:18:29,440
along the coast

503
00:18:33,669 --> 00:18:31,440
so for me personally that's that's very

504
00:18:35,830 --> 00:18:33,679
exciting yeah

505
00:18:36,870 --> 00:18:35,840
it is very exciting and sarah on

506
00:18:39,830 --> 00:18:36,880
facebook asks

507
00:18:40,390 --> 00:18:39,840
will there be a way to see topographic

508
00:18:43,190 --> 00:18:40,400
maps

509
00:18:46,630 --> 00:18:43,200
of the areas with the predicted ocean's

510
00:18:46,640 --> 00:18:49,669
um

511
00:18:56,630 --> 00:18:53,350
i i am not sure

512
00:18:58,470 --> 00:18:56,640
i am not sure okay

513
00:19:00,070 --> 00:18:58,480

we'll get that question answered later

514
00:19:03,510 --> 00:19:00,080
for you and

515
00:19:06,310 --> 00:19:03,520
also leslie on facebook asks how much

516
00:19:08,070 --> 00:19:06,320
improvement are you i'm sorry peter on

517
00:19:10,789 --> 00:19:08,080
facebook ask is the data

518
00:19:12,390 --> 00:19:10,799
open to researchers for free and then in

519
00:19:14,950 --> 00:19:12,400
a related question

520
00:19:17,029 --> 00:19:14,960
udaya on facebook asks will the data be

521
00:19:17,750 --> 00:19:17,039
available in the public domain for

522
00:19:21,590 --> 00:19:17,760
analysis

523
00:19:24,789 --> 00:19:21,600
under citizen science so yeah actually

524
00:19:25,830 --> 00:19:24,799
the science uh say it's international

525
00:19:26,549 --> 00:19:25,840
it's supposed to be free it's for

526
00:19:29,510 --> 00:19:26,559
everyone

527
00:19:30,630 --> 00:19:29,520
the data are always freely available for

528
00:19:33,830 --> 00:19:30,640
all scientists but

529
00:19:37,590 --> 00:19:33,840
uh but anyone actually anyone can

530
00:19:39,750 --> 00:19:37,600
can go on the data archive websites

531
00:19:40,710 --> 00:19:39,760
and and and download the data and look

532
00:19:43,510 --> 00:19:40,720
at the data

533
00:19:44,310 --> 00:19:43,520
uh it's not restricted and it shouldn't

534
00:19:46,789 --> 00:19:44,320
be

535
00:19:48,870 --> 00:19:46,799
so yeah anyone can have a look at data

536
00:19:50,070 --> 00:19:48,880
yeah

537
00:19:52,710 --> 00:19:50,080
and i know we've talked about this

538
00:19:55,190 --> 00:19:52,720

before 217 how your job can have such an

539
00:19:56,710 --> 00:19:55,200
impact on such a wide variety of people

540
00:20:00,230 --> 00:19:56,720
and people's lives and how

541
00:20:02,950 --> 00:20:00,240
you enjoy seeing that interaction

542
00:20:05,029 --> 00:20:02,960
yeah definitely um talking with the

543
00:20:06,470 --> 00:20:05,039
public about about about science about

544
00:20:08,070 --> 00:20:06,480
the data that's uh

545
00:20:09,830 --> 00:20:08,080
that's that's really fascinating because

546
00:20:13,909 --> 00:20:09,840
actually the goal of what we are doing

547
00:20:17,430 --> 00:20:13,919
is to improve people's lives so

548
00:20:19,830 --> 00:20:17,440
now stu on youtube asks can you please

549
00:20:22,870 --> 00:20:19,840
discuss the software that you use in

550
00:20:29,510 --> 00:20:25,909
okay good question um so i'm using

551
00:20:33,669 --> 00:20:29,520
a language called python

552
00:20:35,669 --> 00:20:33,679
so with with that without it's an

553
00:20:37,750 --> 00:20:35,679
open source software so it's available

554
00:20:41,350 --> 00:20:37,760
free available to anyone

555
00:20:42,310 --> 00:20:41,360
and it just helps me to for example open

556
00:20:45,270 --> 00:20:42,320
the data

557
00:20:47,270 --> 00:20:45,280
the files on my computer and do some

558
00:20:51,669 --> 00:20:47,280
statistics on these files look at the

559
00:20:53,990 --> 00:20:51,679
look at the data compute like means or

560
00:20:55,350 --> 00:20:54,000
standard deviations or in any statistics

561
00:20:57,830 --> 00:20:55,360
on the data to have

562
00:20:59,029 --> 00:20:57,840
the information that uh that i'm that

563
00:21:01,510 --> 00:20:59,039

i'm looking for

564
00:21:02,149 --> 00:21:01,520
uh so i do all that yeah on the computer

565
00:21:05,510 --> 00:21:02,159
using

566
00:21:08,870 --> 00:21:05,520
other software like

567
00:21:12,070 --> 00:21:08,880
matlab or idl

568
00:21:15,990 --> 00:21:12,080
r fortran c

569
00:21:18,870 --> 00:21:16,000
yeah you can you can use all that

570
00:21:20,310 --> 00:21:18,880
and also you talk about how mars is even

571
00:21:22,390 --> 00:21:20,320
making us become more

572
00:21:24,230 --> 00:21:22,400
aware of our own earth tell me a little

573
00:21:26,950 --> 00:21:24,240
bit about that

574
00:21:29,990 --> 00:21:26,960
yeah definitely so we are actually

575
00:21:31,750 --> 00:21:30,000
studying also mars and venus for example

576
00:21:33,510 --> 00:21:31,760
to learn more about about about the

577
00:21:36,710 --> 00:21:33,520
earth because they were formed

578
00:21:40,230 --> 00:21:36,720
uh from i mean at the same time

579
00:21:41,750 --> 00:21:40,240
a long time ago and uh they evolved in

580
00:21:43,350 --> 00:21:41,760
different ways so there are lots of

581
00:21:45,270 --> 00:21:43,360
similarities between these planets but

582
00:21:48,470 --> 00:21:45,280
there are also lots of differences

583
00:21:50,070 --> 00:21:48,480
especially in the atmosphere mars is a

584
00:21:51,590 --> 00:21:50,080
very cold and have a very thin

585
00:21:52,549 --> 00:21:51,600
atmosphere venus has a very dense

586
00:21:55,830 --> 00:21:52,559
atmosphere and they're

587
00:21:56,710 --> 00:21:55,840
very warm and by learning more about

588
00:21:58,950 --> 00:21:56,720

these planets

589
00:22:00,230 --> 00:21:58,960
we can actually learn about the earth

590
00:22:05,990 --> 00:22:00,240
the past of the earth and

591
00:22:09,430 --> 00:22:07,590
and that's really important it's really

592
00:22:11,350 --> 00:22:09,440
interesting how we can

593
00:22:13,350 --> 00:22:11,360
use that as a blueprint for how it all

594
00:22:17,110 --> 00:22:13,360
started for us

595
00:22:20,070 --> 00:22:17,120
yeah definitely now christina on youtube

596
00:22:20,870 --> 00:22:20,080
asks how would you encourage young girls

597
00:22:23,350 --> 00:22:20,880
and women

598
00:22:25,510 --> 00:22:23,360
to start a career in science or in

599
00:22:28,630 --> 00:22:25,520
engineering

600
00:22:31,510 --> 00:22:28,640
yeah that's an excellent question so um

601
00:22:32,149 --> 00:22:31,520
i would say first of all um uh we need

602
00:22:34,950 --> 00:22:32,159
more science

603
00:22:37,029 --> 00:22:34,960
more women in science uh uh there are

604
00:22:38,950 --> 00:22:37,039
more men in science than women

605
00:22:40,870 --> 00:22:38,960
and i would say that the more the women

606
00:22:41,430 --> 00:22:40,880
are going to get involved in science and

607
00:22:43,350 --> 00:22:41,440
the more

608
00:22:46,230 --> 00:22:43,360
uh girls are going to be interested in

609
00:22:49,029 --> 00:22:46,240
science so this is very important

610
00:22:50,070 --> 00:22:49,039
and i would say as a as an advice is to

611
00:22:51,909 --> 00:22:50,080
maybe surround

612
00:22:53,669 --> 00:22:51,919
surround yours yourself if you're

613
00:22:56,470 --> 00:22:53,679

curious about science and and

614
00:22:57,909 --> 00:22:56,480
just just go for it and and surround

615
00:23:01,029 --> 00:22:57,919
yourself with other women

616
00:23:04,070 --> 00:23:01,039
who are uh scientists uh whether it's

617
00:23:06,149 --> 00:23:04,080
in your area or or not and uh

618
00:23:08,470 --> 00:23:06,159
they you can look up to them and they

619
00:23:10,789 --> 00:23:08,480
can also

620
00:23:11,990 --> 00:23:10,799
make you see that actually you can make

621
00:23:15,110 --> 00:23:12,000
it and

622
00:23:17,830 --> 00:23:15,120
it can give you advice and i think i

623
00:23:18,310 --> 00:23:17,840
learned that recent more recently during

624
00:23:21,590 --> 00:23:18,320
my

625
00:23:24,630 --> 00:23:21,600
there were not

626
00:23:28,549 --> 00:23:24,640
a lot of women around me and

627
00:23:30,630 --> 00:23:28,559
the more in my career i i try to

628
00:23:31,750 --> 00:23:30,640
always have mentors there are women that

629
00:23:33,510 --> 00:23:31,760
i can look up to

630
00:23:35,029 --> 00:23:33,520
and that that really helped so that

631
00:23:38,630 --> 00:23:35,039
would be my advice

632
00:23:40,549 --> 00:23:38,640
yeah well that's great advice severine

633
00:23:41,190 --> 00:23:40,559
and thank you so much for all of your

634
00:23:43,750 --> 00:23:41,200
questions

635
00:23:46,230 --> 00:23:43,760
on social media and thank you severine

636
00:23:49,430 --> 00:23:46,240
for joining us here today

637
00:23:51,669 --> 00:23:49,440
thank you very much the sentinel 6

638
00:23:54,230 --> 00:23:51,679

michael freilix satellite is a true

639
00:23:54,870 --> 00:23:54,240
international collaboration as you just

640
00:23:56,789 --> 00:23:54,880
saw

641
00:23:58,789 --> 00:23:56,799
it is being jointly developed by the

642
00:24:01,510 --> 00:23:58,799
european space agency

643
00:24:04,149 --> 00:24:01,520
nasa the european organization for the

644
00:24:05,190 --> 00:24:04,159
exploration of meteorological satellites

645
00:24:07,750 --> 00:24:05,200
you met sat

646
00:24:09,590 --> 00:24:07,760
and the national oceanic and atmospheric

647
00:24:11,510 --> 00:24:09,600
administration which is noaa

648
00:24:13,350 --> 00:24:11,520
with funding support from the european

649
00:24:16,230 --> 00:24:13,360
commission and technical support

650
00:24:18,390 --> 00:24:16,240
from the french space agency canesse the

651
00:24:21,029 --> 00:24:18,400
sentinel 6 michael freilix satellite is

652
00:24:23,110 --> 00:24:21,039
scheduled to launch on november 10th

653
00:24:24,470 --> 00:24:23,120
so we're less than a month away and

654
00:24:26,310 --> 00:24:24,480
getting very excited

655
00:24:27,510 --> 00:24:26,320
for the latest on the mission please

656
00:24:30,470 --> 00:24:27,520
follow us at

657
00:24:31,269 --> 00:24:30,480
nasa earth on twitter facebook and

658
00:24:33,029 --> 00:24:31,279
instagram

659
00:24:35,350 --> 00:24:33,039
and you can watch all of the behind the

660
00:24:36,390 --> 00:24:35,360
spacecraft video profiles on the nasa

661
00:24:38,549 --> 00:24:36,400
360

662
00:24:40,230 --> 00:24:38,559
youtube channel we're going to be doing

663
00:24:42,149 --> 00:24:40,240

q and a's with sentinel 6 michael

664
00:24:44,870 --> 00:24:42,159
freilix satellite team members

665
00:24:46,070 --> 00:24:44,880
on wednesday afternoon for the next week

666
00:24:47,830 --> 00:24:46,080
next week's our last

667
00:24:50,630 --> 00:24:47,840
week so make sure to follow and

668
00:24:53,430 --> 00:24:50,640
subscribe for those notifications

669
00:24:54,230 --> 00:24:53,440
at nasa earth science your home is our