



RISING SEAS



SCIENCE LIVE

VIRTUAL EDITION

1
00:00:07,674 --> 00:00:08,775
>> HELLO AND WELCOME TO

2
00:00:08,775 --> 00:00:09,542
ANOTHER EPISODE OF

3
00:00:09,542 --> 00:00:11,144
"NASA SCIENCE LIVE",

4
00:00:11,144 --> 00:00:13,580
I'M YOUR HOST LAUREN WARD.

5
00:00:13,580 --> 00:00:14,848
SEA LEVELS ACROSS THE GLOBE

6
00:00:14,848 --> 00:00:16,116
ARE RISING AS A RESULT OF

7
00:00:16,116 --> 00:00:17,550
A CHANGING CLIMATE,

8
00:00:17,550 --> 00:00:18,251
AND THE RATES AT WHICH

9
00:00:18,251 --> 00:00:19,018
THEY ARE RISING

10
00:00:19,018 --> 00:00:20,387
ARE ACCELERATING.

11
00:00:20,387 --> 00:00:21,721
FOR NEARLY THIRTY YEARS,

12
00:00:21,721 --> 00:00:23,123
NASA HAS CONTINUALLY

13
00:00:23,123 --> 00:00:23,757

BEEN TRACKING

14

00:00:23,757 --> 00:00:25,024

THE GLOBAL SURFACE HEIGHT

15

00:00:25,024 --> 00:00:26,493

OF THE OCEAN FROM SPACE

16

00:00:26,493 --> 00:00:27,627

IN ORDER TO UNDERSTAND

17

00:00:27,627 --> 00:00:29,295

SEA LEVEL RISE.

18

00:00:29,295 --> 00:00:30,230

RISING SEA LEVEL

19

00:00:30,230 --> 00:00:31,164

AFFECTS EVERYONE

20

00:00:31,164 --> 00:00:32,432

ACROSS THE GLOBE

21

00:00:32,432 --> 00:00:33,867

FROM COASTAL COMMUNITIES,

22

00:00:33,867 --> 00:00:34,734

TO THOSE LIVING IN

23

00:00:34,734 --> 00:00:36,736

LANDLOCKED REGIONS.

24

00:00:36,736 --> 00:00:37,804

TODAY WE WILL DIVE DEEP

25

00:00:37,804 --> 00:00:39,005

AND DISCUSS HOW NASA

26
00:00:39,005 --> 00:00:40,473
AND OTHERS ACROSS THE GLOBE

27
00:00:40,473 --> 00:00:42,208
ARE MONITORING OUR OCEANS,

28
00:00:42,208 --> 00:00:43,710
AND WHAT COMMUNITIES ARE DOING

29
00:00:43,710 --> 00:00:45,178
TO ALLEVIATE THE IMPACTS

30
00:00:45,178 --> 00:00:46,880
OF SEA LEVEL RISE.

31
00:00:46,880 --> 00:00:48,281
BUT FIRST, WHAT EXACTLY IS

32
00:00:48,281 --> 00:00:50,550
SEA LEVEL RISE?

33
00:00:54,320 --> 00:00:55,221
>> AROUND THE GLOBE,

34
00:00:55,221 --> 00:00:58,291
SEA LEVELS ARE RISING.

35
00:00:58,291 --> 00:00:59,426
GREENHOUSE GAS EMISSIONS

36
00:00:59,426 --> 00:01:01,761
CAUSE OUR PLANET TO WARM

37
00:01:01,761 --> 00:01:03,029
AND EARTH'S OCEANS ABSORB

38
00:01:03,029 --> 00:01:05,932

ABOUT 90% OF THE EXCESS HEAT.

39

00:01:05,932 --> 00:01:07,167

AS ICE MELTS AT THE POLES

40

00:01:07,167 --> 00:01:08,435

AND HIGH IN THE MOUNTAINS,

41

00:01:08,435 --> 00:01:09,169

AND THE MOLECULES

42

00:01:09,169 --> 00:01:10,703

OF OCEAN WATER EXPAND,

43

00:01:10,703 --> 00:01:12,272

THE SEAS ARE MAKING THEIR WAY

44

00:01:12,272 --> 00:01:15,208

ON TO LAND.

45

00:01:15,208 --> 00:01:16,776

SINCE 1880, SEA LEVELS

46

00:01:16,776 --> 00:01:17,977

HAVE RISEN ABOUT EIGHT

47

00:01:17,977 --> 00:01:19,679

TO NINE INCHES.

48

00:01:19,679 --> 00:01:20,346

BUT THE SEAS

49

00:01:20,346 --> 00:01:21,781

DON'T RISE UNIFORMLY,

50

00:01:21,781 --> 00:01:23,049

SOME PLACES ARE AT HIGHER RISK

51
00:01:23,049 --> 00:01:24,751
FOR FLOODING,

52
00:01:24,751 --> 00:01:26,553
AND SEA LEVELS ARE RISING FASTER

53
00:01:26,553 --> 00:01:28,455
AS TIME PASSES.

54
00:01:28,455 --> 00:01:30,056
RIGHT NOW, SEA LEVEL IS RISING

55
00:01:30,056 --> 00:01:32,725
ABOUT 3.3 MILLIMETERS A YEAR,

56
00:01:32,725 --> 00:01:36,463
30% FASTER THAN IN 1992.

57
00:01:36,463 --> 00:01:37,397
HERE AT NASA

58
00:01:37,397 --> 00:01:38,598
WE'RE USING SATELLITES,

59
00:01:38,598 --> 00:01:39,332
LIKE THE NEW

60
00:01:39,332 --> 00:01:41,134
SENTINEL-6 MICHAEL FREILICH,

61
00:01:41,134 --> 00:01:43,069
ALONG WITH SHIPS AND AIRPLANES,

62
00:01:43,069 --> 00:01:43,970
TO STUDY THE PROCESSES

63
00:01:43,970 --> 00:01:46,005

DRIVING SEA LEVELS RISE,

64

00:01:46,005 --> 00:01:49,309

AND THE AFFECTS OF RISING SEAS.

65

00:01:50,643 --> 00:01:51,444

>> OVER THE COURSE OF

66

00:01:51,444 --> 00:01:52,812

NEARLY THREE DECADES,

67

00:01:52,812 --> 00:01:53,847

A SERIES OF SATELLITES

68

00:01:53,847 --> 00:01:54,881

HAVE CIRCLED OUR PLANET

69

00:01:54,881 --> 00:01:56,082

CONTINUOUSLY MEASURING

70

00:01:56,082 --> 00:01:57,484

SEA LEVELS.

71

00:01:57,484 --> 00:01:58,051

THEIR DATA

72

00:01:58,051 --> 00:01:58,985

HAVE HELPED RESEARCHES

73

00:01:58,985 --> 00:01:59,919

REVEAL MYSTERIES

74

00:01:59,919 --> 00:02:00,920

OF WEATHER PHENOMENON

75

00:02:00,920 --> 00:02:02,155

LIKE EL NIÑO,

76
00:02:02,155 --> 00:02:03,523
AND HAVE ALSO HELPED RESEARCHERS

77
00:02:03,523 --> 00:02:05,358
FORECAST HOW MUCH SEA LEVEL RISE

78
00:02:05,358 --> 00:02:07,460
COULD IMPACT OUR COASTLINES.

79
00:02:07,460 --> 00:02:09,062
NOW ENGINEERS AND SCIENTISTS

80
00:02:09,062 --> 00:02:09,863
ARE PREPARING TO LAUNCH

81
00:02:09,863 --> 00:02:11,664
TWO IDENTICAL SATELLITES

82
00:02:11,664 --> 00:02:13,433
TO ADD TO THIS LEGACY.

83
00:02:13,433 --> 00:02:14,434
FIRST, SENTINEL-6

84
00:02:14,434 --> 00:02:15,568
MICHAEL FREILICH,

85
00:02:15,568 --> 00:02:17,136
AND SECOND, SENTINEL-6B,

86
00:02:17,136 --> 00:02:19,205
LAUNCHING FIVE YEARS LATER.

87
00:02:19,205 --> 00:02:20,106
HERE TO TELL US MORE

88
00:02:20,106 --> 00:02:21,174

IS THE SENTINEL-6

89

00:02:21,174 --> 00:02:23,309
PROJECT MANAGER, PARAG VAZE,

90

00:02:23,309 --> 00:02:24,210
WHO HAS BEEN PART OF

91

00:02:24,210 --> 00:02:25,979
SEA LEVEL RISE OBSERVATIONS

92

00:02:25,979 --> 00:02:28,248
FOR NEARLY THIRTY YEARS.

93

00:02:29,148 --> 00:02:30,950
>> I SEE PICTURES OF

94

00:02:30,950 --> 00:02:32,986
COASTAL INUNDATION AND FLOODING.

95

00:02:32,986 --> 00:02:34,654
WHAT MIGHT HAPPEN IN

96

00:02:34,654 --> 00:02:35,755
THE NEXT HUNDRED YEARS

97

00:02:35,755 --> 00:02:37,891
WITH THE TWO HUNDRED MILLION

98

00:02:37,891 --> 00:02:40,260
PLUS PEOPLE WHO LIVE IN

99

00:02:40,260 --> 00:02:41,895
THOSE LOW-LYING COASTAL AREAS

100

00:02:41,895 --> 00:02:43,930
ALL ACROSS THE GLOBE?

101
00:02:43,930 --> 00:02:45,832
MY NAME IS PARAG VAZE,

102
00:02:45,832 --> 00:02:47,066
AND I DO ANYTHING

103
00:02:47,066 --> 00:02:48,201
AND EVERYTHING

104
00:02:48,201 --> 00:02:49,002
THAT'S NEEDED TO

105
00:02:49,002 --> 00:02:51,437
MAKE SENTINEL-6 PROJECTS

106
00:02:51,437 --> 00:02:52,238
SUCCESSFUL.

107
00:02:52,238 --> 00:02:54,340
SENTINEL-6 IS ALL ABOUT WATER.

108
00:02:54,340 --> 00:02:55,875
SO THIS IS A, UM,

109
00:02:55,875 --> 00:02:57,544
A ONE THIRD SCALE MODEL

110
00:02:57,544 --> 00:02:59,679
OF THE SENTINEL-6 SATELLITE.

111
00:02:59,679 --> 00:03:00,547
SENTINEL-6 IS

112
00:03:00,547 --> 00:03:03,116
A COLLABORATION WITH NASA, NOAA,

113
00:03:03,116 --> 00:03:04,617

THE EUROPEAN SPACE AGENCY,

114

00:03:04,617 --> 00:03:06,953

AND-AND ALSO EUMETSAT IN EUROPE

115

00:03:06,953 --> 00:03:08,221

TO MEASURE SEA LEVEL.

116

00:03:08,221 --> 00:03:09,188

THIS SORT OF TOP HALF

117

00:03:09,188 --> 00:03:11,224

OF THE SATELLITE OF HOUSES, UM,

118

00:03:11,224 --> 00:03:12,425

THE MAIN INSTRUMENTS.

119

00:03:12,425 --> 00:03:14,027

THE HISTORY BEHIND THIS

120

00:03:14,027 --> 00:03:15,395

GOES BACK THIRTY YEARS.

121

00:03:15,395 --> 00:03:17,063

I'VE WORKED ON TOPEX/POSEIDON,

122

00:03:17,063 --> 00:03:19,232

JASON 1, JASON 2, JASON 3,

123

00:03:19,232 --> 00:03:20,233

AND NOW SENTINEL-6.

124

00:03:20,233 --> 00:03:21,301

ALL OF THEM ARE

125

00:03:21,301 --> 00:03:23,503

THE SAME SERIES OF-OF MISSIONS.

126

00:03:23,503 --> 00:03:24,804

IT'S A GREAT, UH,

127

00:03:24,804 --> 00:03:26,205

FEELING OF SATISFACTION.

128

00:03:26,205 --> 00:03:27,874

I HAD ASPIRATIONS RIGHT FROM

129

00:03:27,874 --> 00:03:29,909

CHILDHOOD TO SOMEHOW, UH,

130

00:03:29,909 --> 00:03:31,911

WORK IN THE SPACE INDUSTRY.

131

00:03:31,911 --> 00:03:34,180

I KNEW THAT I WANTED TO WORK IN

132

00:03:34,180 --> 00:03:35,114

SOMETHING THAT MADE

133

00:03:35,114 --> 00:03:36,115

A DIFFERENCE.

134

00:03:36,115 --> 00:03:37,517

THIS IS THE ROOM WHERE WE-WE,

135

00:03:37,517 --> 00:03:38,618

UH, DEVELOPED, INTEGRATED,

136

00:03:38,618 --> 00:03:39,452

TESTED THE SENTINEL-6

137

00:03:39,452 --> 00:03:40,353

INSTRUMENTS.

138

00:03:40,353 --> 00:03:41,254

AND THEN RIGHT HERE

139

00:03:41,254 --> 00:03:42,956

IS WHERE WE PACK IT UP ALSO,

140

00:03:42,956 --> 00:03:44,424

BEFORE WE SHIPPED IT TO GERMANY.

141

00:03:44,424 --> 00:03:46,659

SEEING THAT COME TO FRUITION

142

00:03:46,659 --> 00:03:48,861

IS A PERSONAL SATISFACTION

143

00:03:48,861 --> 00:03:50,830

AND AN EMOTIONAL SATISFACTION.

144

00:03:50,830 --> 00:03:52,966

THE IMPORTANCE OF THIS PROJECT

145

00:03:52,966 --> 00:03:54,400

AND WHERE IT TOUCHES

146

00:03:54,400 --> 00:03:56,402

IS ON ALL WALKS OF LIFE

147

00:03:56,402 --> 00:03:58,972

ALL ACROSS THE WORLD.

148

00:04:01,841 --> 00:04:03,109

>> PARAG, THANK YOU SO MUCH

149

00:04:03,109 --> 00:04:05,044

FOR JOINING US.

150

00:04:05,044 --> 00:04:06,713

>> THANK YOU FOR HAVING ME.

151
00:04:06,713 --> 00:04:07,046
>> ALL RIGHT,

152
00:04:07,046 --> 00:04:08,247
LET'S KICK THIS OFF.

153
00:04:08,247 --> 00:04:09,749
WHY IS IT IMPORTANT

154
00:04:09,749 --> 00:04:12,986
TO STUDY SEA LEVEL RISE AT ALL?

155
00:04:12,986 --> 00:04:14,721
>> YEAH, SEA LEVEL RISE, UH,

156
00:04:14,721 --> 00:04:16,789
IS AN EXTREMELY IMPORTANT TOPIC,

157
00:04:16,789 --> 00:04:18,257
UH, FOR EVERYONE.

158
00:04:18,257 --> 00:04:19,826
UH, SOMETHING THAT, UH,

159
00:04:19,826 --> 00:04:21,094
PEOPLE HAVE, UH,

160
00:04:21,094 --> 00:04:22,862
SEEN IN THEIR BACK YARDS WITH,

161
00:04:22,862 --> 00:04:24,797
UH, WITH THE OCEANS ACTUALLY,

162
00:04:24,797 --> 00:04:27,400
UH, CHANGING OVER TIME.

163
00:04:27,400 --> 00:04:28,835

UH, IT'S SOMETHING THAT PEOPLE

164

00:04:28,835 --> 00:04:30,436

ARE NOTICING MORE RECENTLY

165

00:04:30,436 --> 00:04:31,671

BUT SOMETHING THAT PEOPLE

166

00:04:31,671 --> 00:04:32,438

HAVE KNOWN FOR

167

00:04:32,438 --> 00:04:33,606

A LONG, LONG TIME.

168

00:04:33,606 --> 00:04:35,408

UH, AND IT AFFECTS, UH,

169

00:04:35,408 --> 00:04:36,309

EVERY DAY LIFE,

170

00:04:36,309 --> 00:04:37,844

IT AFFECTS COMMERCE,

171

00:04:37,844 --> 00:04:40,446

IT AFFECTS, UH, SHIPPING, UH,

172

00:04:40,446 --> 00:04:41,981

ALL KINDS OF APPLICATIONS

173

00:04:41,981 --> 00:04:43,750

WHERE PEOPLE REALLY WANT AND

174

00:04:43,750 --> 00:04:45,652

NEED TO KNOW WHAT'S HAPPENING

175

00:04:45,652 --> 00:04:48,421

ON-ON OUR OCEANS, WHICH, UH,

176
00:04:48,421 --> 00:04:50,089
YOU KNOW, SURROUND OUR EARTH,

177
00:04:50,089 --> 00:04:52,425
UH, FOR, UH, THE VAST MAJORITY

178
00:04:52,425 --> 00:04:54,293
OF-OF THE EARTH, UH, HAVING,

179
00:04:54,293 --> 00:04:56,362
UH, OCEANS-HAVING, UH OCEANS,

180
00:04:56,362 --> 00:04:57,030
UH, 70%.

181
00:04:57,030 --> 00:04:59,432
>> THAT'S RIGHT.

182
00:04:59,432 --> 00:05:01,067
UH, YOU MAKE A GREAT POINT,

183
00:05:01,067 --> 00:05:03,603
YOU KNOW, UH, IT'S MOST OF OUR--

184
00:05:03,603 --> 00:05:04,904
IT'S MOST OF PLANET EARTH.

185
00:05:04,904 --> 00:05:06,773
UM, SO WHAT WILL THIS MISSION

186
00:05:06,773 --> 00:05:08,574
IN PARTICULAR CONTRIBUTE

187
00:05:08,574 --> 00:05:09,742
TO THE EFFORT OF STUDYING

188
00:05:09,742 --> 00:05:12,245

SEA LEVEL RISE?

189

00:05:12,245 --> 00:05:13,946

>> RIGHT SO-SO SEA LEVEL RISE,

190

00:05:13,946 --> 00:05:15,381

OR SEA LEVEL, UH,

191

00:05:15,381 --> 00:05:17,316

HAS BEEN AN IMPORTANT TOPIC

192

00:05:17,316 --> 00:05:17,817

FOR PEOPLE,

193

00:05:17,817 --> 00:05:19,652

BUT REALLY UNDERSTANDING AND

194

00:05:19,652 --> 00:05:21,320

QUANTIFYING WHAT'S HAPPENING

195

00:05:21,320 --> 00:05:23,389

WITH THE-WITH THE OCEAN, UH,

196

00:05:23,389 --> 00:05:25,391

IS-IS DIFFICULT TO DO.

197

00:05:25,391 --> 00:05:27,493

UH, IT'S-IT'S CHANGING SLOWLY

198

00:05:27,493 --> 00:05:29,395

BUT IT IS CHANGING.

199

00:05:29,395 --> 00:05:31,597

UH, AND UNDERSTANDING HOW,

200

00:05:31,597 --> 00:05:32,699

UH-UH, QUICKLY

201
00:05:32,699 --> 00:05:35,601
THAT'S CHANGING REQUIRES

202
00:05:35,601 --> 00:05:37,070
REALLY A MEASUREMENT,

203
00:05:37,070 --> 00:05:38,671
A VERY PRECISE MEASUREMENT

204
00:05:38,671 --> 00:05:40,106
AND A CONTINUOUS MEASUREMENT.

205
00:05:40,106 --> 00:05:42,542
SO SENTINEL-6 WILL CONTINUE

206
00:05:42,542 --> 00:05:43,609
THAT MEASUREMENT

207
00:05:43,609 --> 00:05:44,644
THAT'S BEEN ESTABLISHED

208
00:05:44,644 --> 00:05:46,112
FOR TWENTY-EIGHT YEARS

209
00:05:46,112 --> 00:05:47,880
AND WHAT'S SPECIAL IS-IS

210
00:05:47,880 --> 00:05:49,248
REALLY CONTINUE THAT

211
00:05:49,248 --> 00:05:50,016
OVER THE COURSE OF

212
00:05:50,016 --> 00:05:51,851
THE NEXT DECADES WITH, UH,

213
00:05:51,851 --> 00:05:52,885

WITH TWO SATELLITES,

214

00:05:52,885 --> 00:05:54,754

NOT JUST THE ONE OFF SATELLITE,

215

00:05:54,754 --> 00:05:55,988

BUT TWO SATELLITES, UH,

216

00:05:55,988 --> 00:05:57,356

TO-TO REALLY, UH,

217

00:05:57,356 --> 00:05:59,926

ESTABLISH AND CONTINUE THAT.

218

00:05:59,926 --> 00:06:00,993

>> THAT'S REMARKABLE.

219

00:06:00,993 --> 00:06:01,828

UH, YOU KNOW ONE THING

220

00:06:01,828 --> 00:06:02,428

THAT I THINK IS

221

00:06:02,428 --> 00:06:04,597

REALLY INTERESTING IS, UM,

222

00:06:04,597 --> 00:06:06,032

HOW WILL IT ACTUALLY

223

00:06:06,032 --> 00:06:07,200

MEASURE SEA LEVEL RISE,

224

00:06:07,200 --> 00:06:08,801

AND HOW WILL THAT CONTRIBUTE TO

225

00:06:08,801 --> 00:06:10,303

WHAT WE ALREADY KNOW ABOUT

226

00:06:10,303 --> 00:06:12,739

SEA LEVEL RISE?

227

00:06:12,739 --> 00:06:13,806

>> YEAH SO, UH,

228

00:06:13,806 --> 00:06:14,707

PEOPLE HAVE BEEN INTERESTED

229

00:06:14,707 --> 00:06:16,242

IN MEASURING SEA LEVEL,

230

00:06:16,242 --> 00:06:18,010

THEY'VE BEEN USING, UH,

231

00:06:18,010 --> 00:06:19,412

YOU KNOW, DIPSTICKS ESSENTIALLY

232

00:06:19,412 --> 00:06:22,415

IN-IN-IN THE YEARS, UH,

233

00:06:22,415 --> 00:06:23,883

SINCE WHEN SHIPS WERE OUT

234

00:06:23,883 --> 00:06:25,318

ON THE OCEAN, UH,

235

00:06:25,318 --> 00:06:26,385

AND PEOPLE WERE CURIOUS

236

00:06:26,385 --> 00:06:28,254

WHAT'S HAPPENING IN, UH, LIVING,

237

00:06:28,254 --> 00:06:30,723

UH, CLOSE TO-CLOSE TO THE OCEAN.

238

00:06:30,723 --> 00:06:32,158

UH, BUT THAT IS

239

00:06:32,158 --> 00:06:33,593

A DIFFICULT PROCESS

240

00:06:33,593 --> 00:06:34,293

TO REALLY UNDERSTAND

241

00:06:34,293 --> 00:06:35,628

WHAT'S ACTUALLY HAPPENING

242

00:06:35,628 --> 00:06:37,463

PRECISELY ACROSS THE WORLD.

243

00:06:37,463 --> 00:06:39,432

SO SATELLITE REMOTE SENSING

244

00:06:39,432 --> 00:06:42,135

REALLY IS A SOLUTION, UH,

245

00:06:42,135 --> 00:06:43,536

THAT ALLOWS US TO UNDERSTAND

246

00:06:43,536 --> 00:06:46,172

WHAT'S HAPPENING PRECISELY, UH,

247

00:06:46,172 --> 00:06:47,740

OVER ALL OF THE OCEANS

248

00:06:47,740 --> 00:06:50,243

ACROSS THE WHOLE WORLD.

249

00:06:50,243 --> 00:06:51,978

>> SO I UNDERSTAND SENTINEL-6

250

00:06:51,978 --> 00:06:53,246

IS AN INTERNATIONAL MISSION,

251
00:06:53,246 --> 00:06:54,213
SPEAKING OF SEEING

252
00:06:54,213 --> 00:06:55,615
THE WHOLE WORLD, UM,

253
00:06:55,615 --> 00:06:56,516
CAN YOU SPEAK ABOUT

254
00:06:56,516 --> 00:06:58,618
SOME OF THE GLOBAL COLLABORATION

255
00:06:58,618 --> 00:07:00,052
THAT HAPPENED, UH,

256
00:07:00,052 --> 00:07:01,154
TO-TO GET THIS MISSION

257
00:07:01,154 --> 00:07:03,222
OFF THE GROUND?

258
00:07:03,222 --> 00:07:05,224
>> YEAH SO, UM, IT'S A-

259
00:07:05,224 --> 00:07:06,692
IT'S A GLOBAL PROBLEM,

260
00:07:06,692 --> 00:07:07,960
IT'S A DIFFICULT PROBLEM,

261
00:07:07,960 --> 00:07:10,730
SO, UH, IT REQUIRES, UH,

262
00:07:10,730 --> 00:07:13,166
YOU KNOW, A-A GLOBAL SOLUTION

263
00:07:13,166 --> 00:07:14,767

AND THAT MEANS PEOPLE, UH,

264

00:07:14,767 --> 00:07:16,269

FROM ALL SKILL LEVELS

265

00:07:16,269 --> 00:07:17,703

CONTRIBUTING TO THAT,

266

00:07:17,703 --> 00:07:18,571

THAT HAS ACTUALLY

267

00:07:18,571 --> 00:07:19,872

BEEN HAPPENING, UM,

268

00:07:19,872 --> 00:07:21,741

AND WITH ENGINEERS, SCIENTISTS,

269

00:07:21,741 --> 00:07:24,010

USERS, UH, FOR MANY, MANY YEARS.

270

00:07:24,010 --> 00:07:25,678

BUT SENTINEL-6 BRINGS

271

00:07:25,678 --> 00:07:26,712

THAT TOGETHER

272

00:07:26,712 --> 00:07:28,581

IN AN OPERATIONAL SENSE.

273

00:07:28,581 --> 00:07:29,515

UH, IT GOES FROM

274

00:07:29,515 --> 00:07:30,349

TAKING SOMETHING

275

00:07:30,349 --> 00:07:32,885

THAT'S BEEN DONE TOGETHER, UH,

276
00:07:32,885 --> 00:07:34,020
AND BRINGING ALL THE RESOURCES

277
00:07:34,020 --> 00:07:35,154
AND MINDS TOGETHER,

278
00:07:35,154 --> 00:07:36,889
UH-UH TRADITIONALLY

279
00:07:36,889 --> 00:07:38,124
FOR THE PAST TWENTY-EIGHT YEARS,

280
00:07:38,124 --> 00:07:39,325
AND REALLY LOOKS TOWARDS

281
00:07:39,325 --> 00:07:40,126
MAKING THAT INTO

282
00:07:40,126 --> 00:07:41,828
AN OPERATIONAL SERVICE

283
00:07:41,828 --> 00:07:42,695
THAT'S GONNA CONTINUE

284
00:07:42,695 --> 00:07:44,397
FOR THE NEXT, UH, DECADES,

285
00:07:44,397 --> 00:07:46,399
OR-OR-OR MORE.

286
00:07:46,399 --> 00:07:46,866
>> YES.

287
00:07:46,866 --> 00:07:48,534
AS YOU SAY, GLOBAL PROBLEMS

288
00:07:48,534 --> 00:07:50,102

REQUIRE GLOBAL SOLUTIONS,

289

00:07:50,102 --> 00:07:51,838

AND WE ARE DOING JUST THAT.

290

00:07:51,838 --> 00:07:53,139

UM, BUT THAT'S ALL THE TIME

291

00:07:53,139 --> 00:07:55,007

WE HAVE, UM, THANK YOU SO MUCH

292

00:07:55,007 --> 00:07:56,809

FOR JOINING US, PARAG.

293

00:07:56,809 --> 00:07:58,277

>> THANK YOU FOR HAVING ME.

294

00:07:58,277 --> 00:07:59,178

>> A SATELLITE DEDICATED TO

295

00:07:59,178 --> 00:08:00,613

UNCOVERING NEW KNOWLEDGE

296

00:08:00,613 --> 00:08:02,114

ABOUT OUR RISING SEAS,

297

00:08:02,114 --> 00:08:03,282

DESERVES TO BE NAMED AFTER

298

00:08:03,282 --> 00:08:04,851

SOMEONE WHO DEDICATED HIS LIFE

299

00:08:04,851 --> 00:08:06,786

TO UNDERSTANDING OUR OCEANS.

300

00:08:06,786 --> 00:08:07,687

THAT IS WHY NASA'S

301
00:08:07,687 --> 00:08:08,621
EUROPEAN PARTNERS

302
00:08:08,621 --> 00:08:09,388
ON THIS MISSION,

303
00:08:09,388 --> 00:08:11,691
NAMED SENTINEL-6A SATELLITE

304
00:08:11,691 --> 00:08:13,826
IN HONOR OF MICHAEL FREILICH,

305
00:08:13,826 --> 00:08:15,394
A WORLD RENOWNED OCEANOGRAPHER

306
00:08:15,394 --> 00:08:16,495
AND FORMER DIRECTOR OF

307
00:08:16,495 --> 00:08:18,998
NASA'S EARTH SCIENCE DIVISION.

308
00:08:18,998 --> 00:08:20,032
MIKE'S CONTRIBUTIONS TO

309
00:08:20,032 --> 00:08:23,269
EARTH SCIENCE WERE INVALUABLE.

310
00:08:24,537 --> 00:08:27,673
>> MY STORY IS LIKELY QUITE

311
00:08:27,673 --> 00:08:29,175
A-TYPICAL.

312
00:08:29,175 --> 00:08:32,745
I KNEW IN TENTH GRADE

313
00:08:32,745 --> 00:08:33,980

THAT I WANTED TO BE

314

00:08:33,980 --> 00:08:36,182

A NEAR SHORE OCEANOGRAPHER.

315

00:08:36,182 --> 00:08:37,783

WHAT HAS DRIVEN ME

316

00:08:37,783 --> 00:08:40,086

IS UNDERSTANDING

317

00:08:40,086 --> 00:08:42,688

HOW NATURE WORKS.

318

00:08:42,688 --> 00:08:45,324

>> AND THAT'S WHY HUMANITY,

319

00:08:45,324 --> 00:08:49,362

NOT ONE AGENCY, NOT ONE COUNTRY,

320

00:08:49,362 --> 00:08:51,364

NOT ONE CONTINENT,

321

00:08:51,364 --> 00:08:53,332

BUT WHY HUMANITY HAS BEEN

322

00:08:53,332 --> 00:08:55,201

MONITORING GLOBAL SEA LEVEL

323

00:08:55,201 --> 00:08:56,702

FROM SPACE WITH

324

00:08:56,702 --> 00:08:59,572

EXQUISITE ACCURACY FOR

325

00:08:59,572 --> 00:09:01,774

MORE THAN TWENTY-EIGHT YEARS.

326

00:09:01,774 --> 00:09:02,541

>> HE'S A WORLD-RENOWNED

327

00:09:02,541 --> 00:09:03,843

OCEAN SCIENTIST,

328

00:09:03,843 --> 00:09:05,311

WHO AFTER A SUCCESSFUL CAREER

329

00:09:05,311 --> 00:09:07,747

IN ACADEMIA CAME TO NASA,

330

00:09:07,747 --> 00:09:09,248

AND FOR A DOZEN YEARS,

331

00:09:09,248 --> 00:09:10,683

DR. MIKE FREILICH

332

00:09:10,683 --> 00:09:12,151

LED ALL OF EARTH SCIENCE.

333

00:09:12,151 --> 00:09:13,319

>> AND THIS REALLY BROUGHT NASA

334

00:09:13,319 --> 00:09:16,522

BACK ON THE INTERNATIONAL STAGE.

335

00:09:16,522 --> 00:09:17,823

>> AND THIS IS NOT WRONG,

336

00:09:17,823 --> 00:09:19,358

YOU ALSO CHANGED THE DISCIPLINE

337

00:09:19,358 --> 00:09:21,093

OF EARTH SCIENCE

338

00:09:21,093 --> 00:09:22,862

IN A PROFOUND WAY,

339

00:09:22,862 --> 00:09:24,196

COMBINING SCIENCE AND TECHNOLOGY

340

00:09:24,196 --> 00:09:25,031

TO UNDERSTAND

341

00:09:25,031 --> 00:09:26,732

OUR BEAUTIFUL PLANET.

342

00:09:26,732 --> 00:09:28,668

>> MIKE FREILICH'S LEGACY

343

00:09:28,668 --> 00:09:30,202

IS BEING ABLE TO

344

00:09:30,202 --> 00:09:31,237

BUILD THE COALITIONS

345

00:09:31,237 --> 00:09:32,772

THAT ARE NECESSARY FOR US

346

00:09:32,772 --> 00:09:34,974

TO GET AS MUCH UNDERSTANDING

347

00:09:34,974 --> 00:09:36,709

OF OUR PLANET AS POSSIBLE.

348

00:09:36,709 --> 00:09:38,144

THERE IS NOT ANOTHER PERSON

349

00:09:38,144 --> 00:09:39,478

MORE DESERVING OF THIS HONOR

350

00:09:39,478 --> 00:09:40,479

THAN MIKE FREILICH.

351
00:09:40,479 --> 00:09:42,181
>> I AM VERY PLEASSED TO RENAME

352
00:09:42,181 --> 00:09:44,450
SENTINEL-6A IN THE FUTURE

353
00:09:44,450 --> 00:09:46,218
TO BE CALLED SENTINEL-6

354
00:09:46,218 --> 00:09:47,320
MICHAEL FREILICH.

355
00:09:47,320 --> 00:09:51,357
[APPLAUSE]

356
00:09:52,458 --> 00:09:52,858
>> YOU KNOW,

357
00:09:52,858 --> 00:09:55,094
WHEN I-WHEN I FIRST FOUND OUT,

358
00:09:55,094 --> 00:09:57,997
UH, THAT MIKE HAD--

359
00:09:57,997 --> 00:09:58,898
WHEN I FIRST FOUND OUT

360
00:09:58,898 --> 00:10:00,466
THAT MIKE HAD CANCER,

361
00:10:00,466 --> 00:10:02,301
I WANT HIM TO KNOW THAT, UM,

362
00:10:02,301 --> 00:10:03,202
ALL THE WORK HE'S DONE

363
00:10:03,202 --> 00:10:04,937

IS EXTREMELY MEANINGFUL.

364

00:10:04,937 --> 00:10:06,339

>> I AM MUCH BETTER

365

00:10:06,339 --> 00:10:07,740

BECAUSE OF WHAT I LEARNED

366

00:10:07,740 --> 00:10:08,975

FROM HIM AND BECAUSE

367

00:10:08,975 --> 00:10:09,809

I HAD THE OPPORTUNITY

368

00:10:09,809 --> 00:10:10,810

TO WORK WITH HIM.

369

00:10:10,810 --> 00:10:12,678

>> MIKE IS A LEADER

370

00:10:12,678 --> 00:10:13,813

TO ALL OF US,

371

00:10:13,813 --> 00:10:15,147

AND A MENTOR,

372

00:10:15,147 --> 00:10:16,849

AND, UH, A PERSON WHO REALLY

373

00:10:16,849 --> 00:10:18,184

DEMANDS EARTH SCIENCE

374

00:10:18,184 --> 00:10:19,352

FOR THE ENTIRE WORLD.

375

00:10:19,352 --> 00:10:20,653

>> HE WAS ABSOLUTELY

376
00:10:20,653 --> 00:10:22,922
COMMITTED TO DISPASSIONATELY

377
00:10:22,922 --> 00:10:24,523
FOLLOWING THE SCIENCE.

378
00:10:24,523 --> 00:10:25,825
>> HE HAD HIGH STANDARDS

379
00:10:25,825 --> 00:10:27,593
FOR HIMSELF, UH,

380
00:10:27,593 --> 00:10:29,095
AND EVERYONE AROUND HIM.

381
00:10:29,095 --> 00:10:30,129
>> WE'RE ABLE TO RAISE THE BAR

382
00:10:30,129 --> 00:10:31,030
OF WHAT WE CAN EXPECT

383
00:10:31,030 --> 00:10:32,264
FROM OURSELVES,

384
00:10:32,264 --> 00:10:33,299
FROM OUR PARTNERS,

385
00:10:33,299 --> 00:10:34,166
AND FROM OUR LARGER

386
00:10:34,166 --> 00:10:35,334
GLOBAL COMMUNITY.

387
00:10:35,334 --> 00:10:36,769
>> MIKE HAD A VERY BIG,

388
00:10:36,769 --> 00:10:39,939

UH, VERY FULL RED PEN.

389

00:10:39,939 --> 00:10:40,940
EVERYBODY WAS ALWAYS

390

00:10:40,940 --> 00:10:42,274
AFRAID OF THAT RED PEN.

391

00:10:42,274 --> 00:10:44,777
>> HIS PRETTY INTENSE ENERGY

392

00:10:44,777 --> 00:10:46,112
AND ONE OF THE CHARACTERISTICS

393

00:10:46,112 --> 00:10:47,313
WAS THE BOUNCING KNEE,

394

00:10:47,313 --> 00:10:48,314
WHICH YOU NEVER MISSED

395

00:10:48,314 --> 00:10:49,482
AND IT WAS ALWAYS THERE

396

00:10:49,482 --> 00:10:50,750
AND YOU COULD KIND OF GAUGE

397

00:10:50,750 --> 00:10:51,917
THE WAY THE MEETING IS GOING

398

00:10:51,917 --> 00:10:53,419
BY THE PACE OF THE BOUNCE.

399

00:10:53,419 --> 00:10:54,720
>> I HAVE A LOT OF,

400

00:10:54,720 --> 00:10:56,922
UH, EMAILS-EMAILS,

401
00:10:56,922 --> 00:10:58,557
ON MY SMARTPHONE EXCHANGED

402
00:10:58,557 --> 00:10:59,325
WITH MIKE,

403
00:10:59,325 --> 00:11:00,626
WHICH I KEEP AS A TREASURE.

404
00:11:00,626 --> 00:11:01,560
>> IT IS A NO-BRAINER THAT,

405
00:11:01,560 --> 00:11:04,163
UH-UH, THAT-THAT WE ALL

406
00:11:04,163 --> 00:11:05,531
CAME TOGETHER AND, UH,

407
00:11:05,531 --> 00:11:06,565
AND THAT THEY WERE ABLE

408
00:11:06,565 --> 00:11:08,134
TO-TO REALLY RALLY AROUND

409
00:11:08,134 --> 00:11:09,702
AND-AND-AND ALLOW,

410
00:11:09,702 --> 00:11:11,537
UM, THE NAME, RENAMING OF,

411
00:11:11,537 --> 00:11:13,672
UH, SENTINEL-6A AFTER MIKE.

412
00:11:13,672 --> 00:11:14,640
>> EARTH SYSTEM SCIENCE

413
00:11:14,640 --> 00:11:16,442

IS BIGGER THAN ANY

414

00:11:16,442 --> 00:11:18,077
PARTICULAR AGENCY,

415

00:11:18,077 --> 00:11:19,345
IT'S BIGGER THAN

416

00:11:19,345 --> 00:11:21,547
ANY SINGLE NATION,

417

00:11:21,547 --> 00:11:22,381
IT'S BIGGER THAN ANY

418

00:11:22,381 --> 00:11:24,383
SINGLE CONTINENT.

419

00:11:24,383 --> 00:11:25,985
AND I SURELY HOPE,

420

00:11:25,985 --> 00:11:28,521
BECAUSE HUMANITY REQUIRES IT,

421

00:11:28,521 --> 00:11:30,456
THAT WE MAKE SOME SIGNIFICANT

422

00:11:30,456 --> 00:11:32,925
PROGRESS IN UNDERSTANDING.

423

00:11:32,925 --> 00:11:34,393
>> YOU DID GOOD, DR. FREILICH

424

00:11:34,393 --> 00:11:35,628
FOR ALL OF US,

425

00:11:35,628 --> 00:11:36,495
AND FOR THAT WE'RE ALL

426

00:11:36,495 --> 00:11:37,863

VERY GRATEFUL.

427

00:11:46,672 --> 00:11:47,640

>> MIKE FREILICH WAS

428

00:11:47,640 --> 00:11:48,774

A LEADER IN EARTH SCIENCE

429

00:11:48,774 --> 00:11:50,009

WHO BELIEVED IN FOSTERING

430

00:11:50,009 --> 00:11:51,277

INTERNATIONAL PARTNERSHIPS

431

00:11:51,277 --> 00:11:52,445

TO IMPROVE OUR UNDERSTANDING

432

00:11:52,445 --> 00:11:54,213

OF ALL EARTH SYSTEMS,

433

00:11:54,213 --> 00:11:55,881

INCLUDING OUR OCEANS.

434

00:11:55,881 --> 00:11:56,615

LET'S GET TO KNOW SOME OF

435

00:11:56,615 --> 00:11:57,750

THE PEOPLE BEHIND THIS

436

00:11:57,750 --> 00:12:00,352

TRULY INTERNATIONAL MISSION.

437

00:12:00,352 --> 00:12:01,220

>> THIS IS THIS BIG

438

00:12:01,220 --> 00:12:02,321

COMPLEX MACHINE THAT

439

00:12:02,321 --> 00:12:03,889

WE'RE TRYING TO UNDERSTAND.

440

00:12:03,889 --> 00:12:04,323

>> WE REALLY NEED TO

441

00:12:04,323 --> 00:12:05,491

UNDERSTAND HOW IT'S CHANGING,

442

00:12:05,491 --> 00:12:06,959

HOW IS IT EVOLVING.

443

00:12:06,959 --> 00:12:07,593

>> WHEREVER YOU LIVE

444

00:12:07,593 --> 00:12:08,828

ON THIS GLOBE,

445

00:12:08,828 --> 00:12:10,196

THE OCEANS WILL INFLUENCE YOU

446

00:12:10,196 --> 00:12:11,664

IN SOME FORM OR THE OTHER.

447

00:12:11,664 --> 00:12:12,798

>> WE ARE ANSWERING THOSE

448

00:12:12,798 --> 00:12:14,066

REALLY INTERESTING

449

00:12:14,066 --> 00:12:15,334

AND HARD QUESTIONS

450

00:12:15,334 --> 00:12:16,168

THAT WE ALL HAVE

451

00:12:16,168 --> 00:12:17,136

ABOUT OUR UNIVERSE

452

00:12:17,136 --> 00:12:18,304

AND OUR PLANET.

453

00:12:18,304 --> 00:12:20,005

>> MY NAME IS SEVERINE FOURNIER,

454

00:12:20,005 --> 00:12:21,607

AND I'M OBSERVING OUR CHANGING

455

00:12:21,607 --> 00:12:23,008

OCEANS FROM SPACE.

456

00:12:23,008 --> 00:12:23,909

>> I'M SHANNON STATHAM,

457

00:12:23,909 --> 00:12:25,945

AND HERE AT NASA JPL,

458

00:12:25,945 --> 00:12:27,346

I HELP PREPARE SENTINEL-6

459

00:12:27,346 --> 00:12:28,747

FOR ITS JOURNEY TO SPACE.

460

00:12:28,747 --> 00:12:30,015

>> MY NAME IS SHAILEN DESAI.

461

00:12:30,015 --> 00:12:31,817

>> MY NAME IS PARAG VAZE.

462

00:12:31,817 --> 00:12:32,852

>> MY NAME IS BEN HAMLINGTON

463

00:12:32,852 --> 00:12:33,452

AND I'M STUDYING

464

00:12:33,452 --> 00:12:34,787
SEA LEVEL RISE FROM SPACE.

465

00:12:34,787 --> 00:12:35,721
>> WE'RE LOOKING AT

466

00:12:35,721 --> 00:12:36,755
A ONE-THIRD REPLICA

467

00:12:36,755 --> 00:12:38,157
OF THE SENTINEL-6

468

00:12:38,157 --> 00:12:39,458
MICHAEL FREILICH SATELLITE.

469

00:12:39,458 --> 00:12:40,192
>> SENTINEL-6

470

00:12:40,192 --> 00:12:41,594
IS ALL ABOUT WATER.

471

00:12:41,594 --> 00:12:42,561
>> THIS SORT OF TOP HALF

472

00:12:42,561 --> 00:12:44,230
OF THE SATELLITE HOUSES

473

00:12:44,230 --> 00:12:45,397
THE MAIN INSTRUMENTS.

474

00:12:45,397 --> 00:12:46,165
>> WE HAVE WE THE ALTIMETER,

475

00:12:46,165 --> 00:12:47,733
WE HAVE THE RADIOMETER.

476

00:12:47,733 --> 00:12:48,567

>> SENTINEL-6 IS A

477

00:12:48,567 --> 00:12:50,536

COLLABORATION WITH NASA,

478

00:12:50,536 --> 00:12:52,638

NOAA, THE EUROPEAN SPACE AGENCY,

479

00:12:52,638 --> 00:12:54,440

AND-AND ALSO EUMETSAT

480

00:12:54,440 --> 00:12:56,308

IN EUROPE TO MEASURE SEA LEVEL.

481

00:12:56,308 --> 00:12:57,143

>> AND IT'S SPECIFICALLY

482

00:12:57,143 --> 00:12:58,377

CAPTURING THE HEIGHT

483

00:12:58,377 --> 00:12:59,345

OF THE OCEAN.

484

00:12:59,345 --> 00:13:00,546

>> THE SATELLITE IS ACTUALLY

485

00:13:00,546 --> 00:13:02,081

EMITTING A-A SIGNAL.

486

00:13:02,081 --> 00:13:02,581

>> AND THAT SIGNAL

487

00:13:02,581 --> 00:13:03,382

IS BOUNCING BACK.

488

00:13:03,382 --> 00:13:04,049

>> IT MEASURES THE TIME

489

00:13:04,049 --> 00:13:04,783

IT TAKES FOR THAT PULSE

490

00:13:04,783 --> 00:13:05,351

TO GET BACK.

491

00:13:05,351 --> 00:13:06,385

>> SO WE'VE BEEN MEASURING

492

00:13:06,385 --> 00:13:07,253

THE HEIGHT OF THE OCEAN

493

00:13:07,253 --> 00:13:07,953

SINCE THE BEGINNING

494

00:13:07,953 --> 00:13:08,954

OF THE '90s.

495

00:13:08,954 --> 00:13:09,622

>> I'VE WORKED ON

496

00:13:09,622 --> 00:13:11,056

TOPEX/POSEIDON, JASON 1,

497

00:13:11,056 --> 00:13:12,725

JASON 2, JASON 3.

498

00:13:12,725 --> 00:13:13,626

>> WE REALLY NEED THAT

499

00:13:13,626 --> 00:13:15,528

LONG DURATION OBSERVATION.

500

00:13:15,528 --> 00:13:16,428

>> AND SENTINEL-6

501
00:13:16,428 --> 00:13:17,663
IS GONNA ALLOW US

502
00:13:17,663 --> 00:13:19,198
TO CONTINUE THAT RECORD.

503
00:13:19,198 --> 00:13:19,698
>> SO THAT WE CAN

504
00:13:19,698 --> 00:13:20,566
BETTER PREDICT,

505
00:13:20,566 --> 00:13:21,800
WHAT IS THE RATE OF CHANGE?

506
00:13:21,800 --> 00:13:22,401
WHAT IS IT GONNA

507
00:13:22,401 --> 00:13:23,402
LOOK LIKE IN A YEAR?

508
00:13:23,402 --> 00:13:23,936
FIVE YEARS?

509
00:13:23,936 --> 00:13:24,537
TEN YEARS FROM NOW?

510
00:13:24,537 --> 00:13:25,504
AND SO FORTH.

511
00:13:25,504 --> 00:13:26,305
>> IT'S NOT JUST SCIENTIFIC

512
00:13:26,305 --> 00:13:27,673
CURIOSITY, IT REALLY IMPACTS

513
00:13:27,673 --> 00:13:28,841

THE DAILY LIVES OF PEOPLE

514

00:13:28,841 --> 00:13:29,875

AND THEIR ABILITY TO PLAN

515

00:13:29,875 --> 00:13:30,776

FOR THEIR FUTURE.

516

00:13:30,776 --> 00:13:32,711

>> I SEE PICTURES OF

517

00:13:32,711 --> 00:13:33,812

COASTAL INUNDATION

518

00:13:33,812 --> 00:13:34,780

AND FLOODING.

519

00:13:34,780 --> 00:13:35,514

>> YOU START TO REALIZE

520

00:13:35,514 --> 00:13:36,782

THE IMPORTANCE OF UNDERSTANDING

521

00:13:36,782 --> 00:13:38,117

WHAT SEA LEVEL IS DOING NOW

522

00:13:38,117 --> 00:13:38,851

AND WE CAN USE THAT

523

00:13:38,851 --> 00:13:40,019

UNDERSTANDING TO KNOW

524

00:13:40,019 --> 00:13:40,719

WHAT SEA LEVEL MIGHT BE

525

00:13:40,719 --> 00:13:41,954

DOING IN THE FUTURE.

526
00:13:41,954 --> 00:13:44,190
>> SEEING THAT COME TO FRUITION,

527
00:13:44,190 --> 00:13:46,192
IS A PERSONAL SATISFACTION

528
00:13:46,192 --> 00:13:48,260
AND AN EMOTIONAL SATISFACTION.

529
00:13:48,260 --> 00:13:49,962
>> SCIENTISTS AROUND THE WORLD

530
00:13:49,962 --> 00:13:51,564
ARE USING THIS DATA

531
00:13:51,564 --> 00:13:52,998
TO HELP PEOPLE.

532
00:13:52,998 --> 00:13:54,400
>> THE IMPORTANCE OF THIS

533
00:13:54,400 --> 00:13:56,635
PROJECT AND WHERE IT TOUCHES

534
00:13:56,635 --> 00:13:58,637
IS ON ALL WALKS OF LIFE,

535
00:13:58,637 --> 00:14:00,105
ALL ACROSS THE WORLD.

536
00:14:00,105 --> 00:14:00,806
>> FROM SPACE

537
00:14:00,806 --> 00:14:02,074
IT'S JUST ONE PLANET.

538
00:14:06,812 --> 00:14:07,613

>> SEA LEVEL RISE

539

00:14:07,613 --> 00:14:08,414
IS A DIRECT RESULT

540

00:14:08,414 --> 00:14:09,682
OF CLIMATE CHANGE.

541

00:14:09,682 --> 00:14:11,483
AS OCEAN TEMPERATURES INCREASE,

542

00:14:11,483 --> 00:14:13,452
OUR GLOBAL OCEAN EXPANDS.

543

00:14:13,452 --> 00:14:14,320
AS ICE SHEETS

544

00:14:14,320 --> 00:14:15,454
AND GLACIERS MELT,

545

00:14:15,454 --> 00:14:17,056
THEY ADD MORE WATER.

546

00:14:17,056 --> 00:14:17,957
BUT CLIMATE CHANGE

547

00:14:17,957 --> 00:14:18,824
HAS MANY IMPACTS

548

00:14:18,824 --> 00:14:20,559
BEYOND SEA LEVEL RISE.

549

00:14:20,559 --> 00:14:21,193
WE'RE JOINED BY

550

00:14:21,193 --> 00:14:22,895
DR. IVONA CETINIC,

551
00:14:22,895 --> 00:14:23,929
AN OCEANOGRAPHER

552
00:14:23,929 --> 00:14:25,397
AT THE OCEAN ECOLOGY LAB

553
00:14:25,397 --> 00:14:26,265
AT NASA'S GODDARD

554
00:14:26,265 --> 00:14:27,566
SPACE FLIGHT CENTER.

555
00:14:27,566 --> 00:14:29,902
THANK YOU FOR JOINING US, IVONA.

556
00:14:29,902 --> 00:14:32,037
>> I'M HAPPY TO BE HERE, LAUREN.

557
00:14:32,037 --> 00:14:33,606
>> ALWAYS HAPPY TO HAVE YOU.

558
00:14:33,606 --> 00:14:35,007
SO WE KNOW THAT SEA LEVEL RISE

559
00:14:35,007 --> 00:14:36,075
IS INCREASING THE HEIGHT

560
00:14:36,075 --> 00:14:37,443
OF THE WORLD'S OCEAN,

561
00:14:37,443 --> 00:14:38,477
BUT CAN YOU TELL US ABOUT

562
00:14:38,477 --> 00:14:39,612
SOME OF THE OTHER THINGS

563
00:14:39,612 --> 00:14:40,512

THAT ARE HAPPENING

564

00:14:40,512 --> 00:14:42,948
DUE TO CLIMATE CHANGE?

565

00:14:42,948 --> 00:14:43,782
>> FOR SURE.

566

00:14:43,782 --> 00:14:45,084
SO, OCEAN AND CLIMATE,

567

00:14:45,084 --> 00:14:46,185
THEY'RE VERY INTERLINKED.

568

00:14:46,185 --> 00:14:47,186
UM, OCEAN'S PART OF

569

00:14:47,186 --> 00:14:49,355
THE FOUR SYSTEMS OF EARTH,

570

00:14:49,355 --> 00:14:50,189
AND EACH OF THEM CAN

571

00:14:50,189 --> 00:14:51,156
ALL HAVE A COOL THING

572

00:14:51,156 --> 00:14:51,690
THAT THEY'RE DOING

573

00:14:51,690 --> 00:14:52,658
AND THEY'RE VERY INTERLINKED

574

00:14:52,658 --> 00:14:53,792
THROUGH THE EXCHANGE OF WATER,

575

00:14:53,792 --> 00:14:55,427
CARBON, OR ENERGY,

576

00:14:55,427 --> 00:14:56,295

AND SO IF ONE KIND OF-

577

00:14:56,295 --> 00:14:57,129

KIND OF FAILS,

578

00:14:57,129 --> 00:14:58,297

THE OTHER ONE COMES TO HELP.

579

00:14:58,297 --> 00:14:59,632

AND-AND OCEAN'S HELPING A LOT

580

00:14:59,632 --> 00:15:00,666

AND TRYING TO CONTROL

581

00:15:00,666 --> 00:15:02,134

THE CLIMATE CHANGE,

582

00:15:02,134 --> 00:15:02,801

UH, BUT THERE'S DIFFERENT

583

00:15:02,801 --> 00:15:04,570

ASPECTS OF-OF-- PROCESSES,

584

00:15:04,570 --> 00:15:05,571

DIFFERENT PROCESSES

585

00:15:05,571 --> 00:15:06,105

THAT ARE HAPPENING

586

00:15:06,105 --> 00:15:07,206

IN THE OCEAN THAT WE CAN SEE

587

00:15:07,206 --> 00:15:08,507

AS A RESULT OF CLIMATE CHANGE.

588

00:15:08,507 --> 00:15:09,575

UM, FIRST ONE IS

589

00:15:09,575 --> 00:15:11,110
THE INCREASE IN TEMPERATURE,

590

00:15:11,110 --> 00:15:11,944
BOTH IN THE SEA SURFACE

591

00:15:11,944 --> 00:15:12,611
AND THE INTERNAL PORTION

592

00:15:12,611 --> 00:15:13,445
OF THE OCEAN

593

00:15:13,445 --> 00:15:14,713
ALL AROUND THE WORLD.

594

00:15:14,713 --> 00:15:15,514
THEN WE HAVE DISAPPEARANCE

595

00:15:15,514 --> 00:15:16,782
OF THE SEA ICE, MOSTLY HAPPENING

596

00:15:16,782 --> 00:15:18,450
IN THE ARCTIC REGION.

597

00:15:18,450 --> 00:15:19,818
THEN WE HAVE THE SEA LEVEL RISE

598

00:15:19,818 --> 00:15:20,953
THAT IS IMPACTED BY THESE

599

00:15:20,953 --> 00:15:22,054
TWO PROCESSES THAT I MENTIONED

600

00:15:22,054 --> 00:15:23,656
BEFORE THAT IS SEEN

601
00:15:23,656 --> 00:15:24,923
ALL AROUND THE COAST,

602
00:15:24,923 --> 00:15:26,325
ALL OVER THE OCEAN.

603
00:15:26,325 --> 00:15:27,059
AND ULTIMATELY WE HAVE

604
00:15:27,059 --> 00:15:28,160
OCEANS ACIDIFICATION,

605
00:15:28,160 --> 00:15:28,994
WHICH IS A PROCESS

606
00:15:28,994 --> 00:15:29,962
THAT'S HAPPENING

607
00:15:29,962 --> 00:15:31,096
BECAUSE THE CARBON DIOXIDE

608
00:15:31,096 --> 00:15:32,331
FROM THE ATMOSPHERE IS MELTING

609
00:15:32,331 --> 00:15:33,332
IN THE OCEAN, IT'S CHANGING

610
00:15:33,332 --> 00:15:35,100
THE ACIDITY OF THE OCEAN.

611
00:15:35,100 --> 00:15:36,101
AND ALL THESE THINGS TOGETHER

612
00:15:36,101 --> 00:15:37,069
IN A SENSE ARE

613
00:15:37,069 --> 00:15:38,404

IMPACTING THE WAY

614

00:15:38,404 --> 00:15:39,772
THAT THE PHYSICS, BIOLOGY,

615

00:15:39,772 --> 00:15:40,673
CHEMISTRY, AND GEOLOGY

616

00:15:40,673 --> 00:15:41,573
OF THE WORK-

617

00:15:41,573 --> 00:15:42,708
OF THE OCEAN'S WORKING,

618

00:15:42,708 --> 00:15:43,776
AND THEN ULTIMATELY

619

00:15:43,776 --> 00:15:45,244
IT IMPACTS US.

620

00:15:45,244 --> 00:15:46,345
>> SO WHAT I'M HEARING FROM YOU

621

00:15:46,345 --> 00:15:46,912
IS THAT IT'S A VERY

622

00:15:46,912 --> 00:15:48,847
COMPLICATED SYSTEM.

623

00:15:48,847 --> 00:15:49,581
>> YEAH, AND VERY

624

00:15:49,581 --> 00:15:51,684
INTRICATELY COLLECTED.

625

00:15:51,684 --> 00:15:53,218
>> WOW, YES.

626
00:15:53,218 --> 00:15:54,453
UM, WHAT TO--

627
00:15:54,453 --> 00:15:55,621
SO I-I THINK ONE THING

628
00:15:55,621 --> 00:15:56,588
THAT PEOPLE MIGHT FIND

629
00:15:56,588 --> 00:15:57,556
SURPRISING IS THAT,

630
00:15:57,556 --> 00:15:58,824
YOU KNOW, NASA HAS

631
00:15:58,824 --> 00:15:59,925
A SUITE OF TOOLS THAT IT USES

632
00:15:59,925 --> 00:16:00,759
TO STUDY THE OCEAN,

633
00:16:00,759 --> 00:16:02,594
AND IT'S NOT JUST SATELLITES.

634
00:16:02,594 --> 00:16:03,762
CAN YOU TELL ABOUT-TELL US

635
00:16:03,762 --> 00:16:04,830
ABOUT SOME OF THOSE TOOLS

636
00:16:04,830 --> 00:16:05,931
THAT WE USE TO MONITOR

637
00:16:05,931 --> 00:16:08,133
THE OCEAN ECOSYSTEMS?

638
00:16:08,133 --> 00:16:09,168

>> FOR SURE.

639

00:16:09,168 --> 00:16:10,202

UM, SO AS AN OCEANOGRAPHER

640

00:16:10,202 --> 00:16:11,270

WORKING AT NASA, I ALWAYS GET,

641

00:16:11,270 --> 00:16:12,504

"LIKE, WHAT?" YOU KNOW,

642

00:16:12,504 --> 00:16:13,472

[CHUCKLING] >> YES.

643

00:16:13,472 --> 00:16:14,373

BUT NASA DOES STUDY EARTH,

644

00:16:14,373 --> 00:16:16,275

AND NASA DOES STUDY OCEANS.

645

00:16:16,275 --> 00:16:17,643

SO FIRST WE HAVE SATELLITES,

646

00:16:17,643 --> 00:16:18,877

UM, AND THERE'S THIS WHOLE

647

00:16:18,877 --> 00:16:20,312

FLEET OF NASA EARTH-OBSERVING

648

00:16:20,312 --> 00:16:21,180

SATELLITES AND SOME OF THEM

649

00:16:21,180 --> 00:16:22,214

ARE ACTUALLY LOOKING

650

00:16:22,214 --> 00:16:23,315

SPECIFICALLY AT THE OCEAN

651
00:16:23,315 --> 00:16:24,450
AND GIVING US THIS CONTINUOUS

652
00:16:24,450 --> 00:16:26,051
AND OPTIC VIEW OF THE OCEAN-

653
00:16:26,051 --> 00:16:27,619
OCEAN'S BEHAVIOR IN A SENSE.

654
00:16:27,619 --> 00:16:28,654
YOU KNOW, IT TALKS ABOUT

655
00:16:28,654 --> 00:16:29,588
PHYSICS, THE TEMPERATURE,

656
00:16:29,588 --> 00:16:30,789
OR BIOLOGY.

657
00:16:30,789 --> 00:16:33,225
UM, AND BIOLOGY IS REALLY COOL

658
00:16:33,225 --> 00:16:34,026
BECAUSE THE STYLE LOOKS

659
00:16:34,026 --> 00:16:35,094
AT THESE TEENY,

660
00:16:35,094 --> 00:16:36,829
TINY PHYTOPLANKTON,

661
00:16:36,829 --> 00:16:37,596
WHICH ARE LIKE TEENY TINY

662
00:16:37,596 --> 00:16:38,530
PLANT-LIKE ORGANISMS

663
00:16:38,530 --> 00:16:39,398

IN THE OCEAN.

664

00:16:39,398 --> 00:16:40,399

AND I'M WORKING ON ONE

665

00:16:40,399 --> 00:16:41,500

OF THESE MISSIONS, UM,

666

00:16:41,500 --> 00:16:42,167

THAT'S GONNA BE LAUNCHED

667

00:16:42,167 --> 00:16:43,068

IN A COUPLE YEARS,

668

00:16:43,068 --> 00:16:44,536

CALLED PACE,

669

00:16:44,536 --> 00:16:46,238

WHICH STAND FOR PLANKTON,

670

00:16:46,238 --> 00:16:48,073

AEROSOL, CLOUD, OCEAN ECOSYSTEM,

671

00:16:48,073 --> 00:16:49,608

AND THAT ONE AMONG OTHER THINGS

672

00:16:49,608 --> 00:16:50,843

WILL LOOK AT THE DIVERSITY

673

00:16:50,843 --> 00:16:52,177

OF THAT PHYTOPLANKTON,

674

00:16:52,177 --> 00:16:53,679

THESE TEENY TINY CREATURES.

675

00:16:53,679 --> 00:16:54,680

SO YOU HAVE THE SATELLITE,

676
00:16:54,680 --> 00:16:56,682
AND THEN WE GO ON FIELD.

677
00:16:56,682 --> 00:16:58,550
WE USE AIRCRAFTS, WE USE,

678
00:16:58,550 --> 00:17:00,018
UM, RESEARCH VESSELS,

679
00:17:00,018 --> 00:17:02,388
WE USE, UM, MOORINGS,

680
00:17:02,388 --> 00:17:03,989
ROBOTS, FIELD STATIONS

681
00:17:03,989 --> 00:17:05,324
TO KIND OF FOCUS ON

682
00:17:05,324 --> 00:17:06,492
SPECIFIC QUESTIONS,

683
00:17:06,492 --> 00:17:07,893
SPECIFIC AREAS.

684
00:17:07,893 --> 00:17:08,660
AND THEN ULTIMATELY

685
00:17:08,660 --> 00:17:09,528
WE TAKE ALL THAT DATA

686
00:17:09,528 --> 00:17:11,196
AND PLUG IT INTO THE MODELS,

687
00:17:11,196 --> 00:17:12,164
UH, SUCH AS BIG EARTH SYSTEM

688
00:17:12,164 --> 00:17:13,332

MODELS THAT CAN REALLY

689

00:17:13,332 --> 00:17:14,266

ALLOW US TO UNDERSTAND

690

00:17:14,266 --> 00:17:15,167

THIS INTERACTION BETWEEN

691

00:17:15,167 --> 00:17:16,101

THE OCEAN AND CLIMATE,

692

00:17:16,101 --> 00:17:17,569

OCEAN ECOSYSTEMS AND CLIMATE,

693

00:17:17,569 --> 00:17:19,505

AND THEN ACTUALLY PREDICT

694

00:17:19,505 --> 00:17:20,139

WHAT'S GONNA HAPPEN

695

00:17:20,139 --> 00:17:21,039

WITH THE OCEAN ECOSYSTEMS

696

00:17:21,039 --> 00:17:22,975

OF TOMORROW.

697

00:17:22,975 --> 00:17:24,176

>> WOW, THAT'S AMAZING.

698

00:17:24,176 --> 00:17:25,244

I LOVE THAT-THAT VISION

699

00:17:25,244 --> 00:17:26,745

OF SEEING, YOU KNOW,

700

00:17:26,745 --> 00:17:28,180

PLANES IN THE SKY, SATELLITES,

701
00:17:28,180 --> 00:17:29,748
BOATS ON THE WATER, EVERYTHING.

702
00:17:29,748 --> 00:17:30,616
>> YEAH, EVERYTHING

703
00:17:30,616 --> 00:17:31,750
COMES TOGETHER.

704
00:17:31,750 --> 00:17:32,785
>> YOU'VE GOT THE WHOLE SUITE.

705
00:17:32,785 --> 00:17:33,685
EXACTLY.

706
00:17:33,685 --> 00:17:34,520
>> YEAH, IT'S-IT'S

707
00:17:34,520 --> 00:17:35,387
PRETTY AWESOME.

708
00:17:35,387 --> 00:17:36,388
>> IT'S AMAZING.

709
00:17:36,388 --> 00:17:37,322
UM, YOU KNOW, I WANNA DIG

710
00:17:37,322 --> 00:17:38,390
INTO THAT A LITTLE BIT DEEPER.

711
00:17:38,390 --> 00:17:39,458
WHAT CHANGES ARE WE SEEING,

712
00:17:39,458 --> 00:17:40,526
UH, TO OCEAN ECOSYSTEMS

713
00:17:40,526 --> 00:17:41,560

DUE TO CLIMATE CHANGE?

714

00:17:41,560 --> 00:17:42,327

THIS SOUNDS LIKE IT'S SOMETHING

715

00:17:42,327 --> 00:17:43,128

THAT'S KIND OF

716

00:17:43,128 --> 00:17:44,797

IN YOUR WHEELHOUSE.

717

00:17:44,797 --> 00:17:46,098

>> YES, SO, UH, WE KNOW

718

00:17:46,098 --> 00:17:47,433

WHEN-WHEN YOU-YOU MENTION

719

00:17:47,433 --> 00:17:48,467

SEA LEVEL RISE

720

00:17:48,467 --> 00:17:49,401

AND-AND THAT'S THE FIRST THING

721

00:17:49,401 --> 00:17:50,469

THAT PEOPLE THINK ABOUT,

722

00:17:50,469 --> 00:17:51,437

UM, CHANGING OCEANS,

723

00:17:51,437 --> 00:17:52,971

AND THAT'S FELT ALONG THE COAST,

724

00:17:52,971 --> 00:17:54,206

YOU KNOW, LIKE 40% OF THE PEOPLE

725

00:17:54,206 --> 00:17:55,040

IN THE U.S. LIVE ALONG

726

00:17:55,040 --> 00:17:55,908

THE COAST AND THAT'S WHERE

727

00:17:55,908 --> 00:17:56,708

YOU FEEL IT THE MOST.

728

00:17:56,708 --> 00:17:58,844

BUT OCEAN HAS ECOSYSTEMS,

729

00:17:58,844 --> 00:18:00,145

AND ALL THESE ECOSYSTEMS,

730

00:18:00,145 --> 00:18:01,680

ALTHOUGH HIDDEN FROM OUR EYES,

731

00:18:01,680 --> 00:18:03,115

UM, THEY'RE THERE IN THE PRESENT

732

00:18:03,115 --> 00:18:04,049

AND THEY'RE CHANGING.

733

00:18:04,049 --> 00:18:05,584

SO, THANKS TO THE NASA

734

00:18:05,584 --> 00:18:06,685

EARTH OBSERVING SATELLITES

735

00:18:06,685 --> 00:18:07,653

WE CAN SEE THOSE CHANGES.

736

00:18:07,653 --> 00:18:08,687

FOR EXAMPLE,

737

00:18:08,687 --> 00:18:09,822

THIS IS PORTIONS OF THE EARTH

738

00:18:09,822 --> 00:18:11,857

THAT WE CALL OCEANIC DESERTS,

739

00:18:11,857 --> 00:18:12,658

WHERE THE NUMBER

740

00:18:12,658 --> 00:18:13,692

OF THE PHYTOPLANKTON

741

00:18:13,692 --> 00:18:14,726

ARE REALLY LOW,

742

00:18:14,726 --> 00:18:15,727

AND THEY'RE ACTUALLY EXTENDING

743

00:18:15,727 --> 00:18:17,696

OVER THE LAST DECADE OR SO.

744

00:18:17,696 --> 00:18:18,564

SO, WE KNOW THAT.

745

00:18:18,564 --> 00:18:19,565

UM, THEN WE GO BACK

746

00:18:19,565 --> 00:18:20,532

TO THE-THE FIELD

747

00:18:20,532 --> 00:18:22,167

AND-AND WE USE VESSELS.

748

00:18:22,167 --> 00:18:23,836

AND WE SEE THAT THE TYPES

749

00:18:23,836 --> 00:18:24,837

OF PHYTOPLANKTON

750

00:18:24,837 --> 00:18:25,704

IN THESE ECOSYSTEMS

751
00:18:25,704 --> 00:18:26,572
ARE CHANGING,

752
00:18:26,572 --> 00:18:27,506
SOME OF THEM ARE ACTUALLY

753
00:18:27,506 --> 00:18:28,407
MOVING POLEWARDS,

754
00:18:28,407 --> 00:18:29,208
KIND OF LIKE TOWARDS,

755
00:18:29,208 --> 00:18:30,409
LET'S SAY NORTH,

756
00:18:30,409 --> 00:18:31,443
AND SO NOW, YOU KNOW,

757
00:18:31,443 --> 00:18:32,411
HOW DOES IT AFFECT YOU?

758
00:18:32,411 --> 00:18:33,178
I'M LIKE, YOU KNOW,

759
00:18:33,178 --> 00:18:33,879
YOU LIVE ON A COAST,

760
00:18:33,879 --> 00:18:35,113
YOU DON'T CARE ABOUT OPEN OCEAN.

761
00:18:35,113 --> 00:18:37,115
WELL, THAT PHYTOPLANKTON

762
00:18:37,115 --> 00:18:38,350
IS FOOD FOR SOMETHING,

763
00:18:38,350 --> 00:18:39,084

IT'S ACTUALLY FOOD FOR

764

00:18:39,084 --> 00:18:40,185
EVERYTHING IN THE OCEAN,

765

00:18:40,185 --> 00:18:41,320
IT'S FOOD FOR THE FISH

766

00:18:41,320 --> 00:18:41,920
THAT WILL ULTIMATELY

767

00:18:41,920 --> 00:18:43,622
END ON YOUR PLATE.

768

00:18:43,622 --> 00:18:44,857
SO, UM, THESE CHANGES

769

00:18:44,857 --> 00:18:46,091
IN THE ECOSYSTEM,

770

00:18:46,091 --> 00:18:46,658
ALTHOUGH YOU'RE NOT

771

00:18:46,658 --> 00:18:47,559
IN A COASTAL AREA,

772

00:18:47,559 --> 00:18:48,727
WILL EVENTUALLY AFFECT

773

00:18:48,727 --> 00:18:50,262
EVERYBODY ON EARTH.

774

00:18:51,430 --> 00:18:52,231
>> YEAH, EVERYTHING'S

775

00:18:52,231 --> 00:18:53,165
ABOUT YOU, RIGHT? YOU KNOW?

776

00:18:53,165 --> 00:18:53,932

>> EXACTLY, YUP.

777

00:18:53,932 --> 00:18:55,234

>> THAT'S, UH, THAT'S KIND OF

778

00:18:55,234 --> 00:18:57,503

A-A HARD AND FAST RULE.

779

00:18:57,503 --> 00:18:58,437

UM, YOU KNOW,

780

00:18:58,437 --> 00:18:59,972

SO WHAT I, YOU KNOW,

781

00:18:59,972 --> 00:19:01,073

WHAT-WHAT STRIKES ME, IVONA,

782

00:19:01,073 --> 00:19:02,808

IS THAT, UM, A LOT OF THIS NEWS

783

00:19:02,808 --> 00:19:04,610

IS-IS KIND OF DISCOURAGING.

784

00:19:04,610 --> 00:19:06,745

YOU WORK WITH DATA THAT, UM,

785

00:19:06,745 --> 00:19:09,615

IS, UM, CAN BE VERY DARK.

786

00:19:09,615 --> 00:19:11,483

WHAT DO YOU DO--

787

00:19:11,483 --> 00:19:12,384

WHY DO YOU CONTINUE

788

00:19:12,384 --> 00:19:13,485

DOING THIS WORK, YOU KNOW,

789

00:19:13,485 --> 00:19:14,786

WHEN-WHEN THE NEWS

790

00:19:14,786 --> 00:19:16,188

THAT YOU'RE GETTING CONSTANTLY

791

00:19:16,188 --> 00:19:19,157

IS UNHAPPY OFTEN?

792

00:19:19,157 --> 00:19:20,192

>> YEAH, SO YOU KNOW,

793

00:19:20,192 --> 00:19:21,393

YOU GET LOTS OF DATA

794

00:19:21,393 --> 00:19:22,427

WHEN YOU'RE WORKING AT NASA,

795

00:19:22,427 --> 00:19:23,228

AND YOU'RE SURROUNDED

796

00:19:23,228 --> 00:19:24,296

BY AMAZING SCIENTISTS

797

00:19:24,296 --> 00:19:25,430

WHO KNOW MUCH MORE THAN I DO.

798

00:19:25,430 --> 00:19:26,465

UM, AND ALL THAT STUFF

799

00:19:26,465 --> 00:19:27,933

IS DISCOURAGING, DEFINITELY,

800

00:19:27,933 --> 00:19:29,668

BUT-BUT THERE'S TWO REASONS

801
00:19:29,668 --> 00:19:30,636
WHY I KEEP ON DOING IT.

802
00:19:30,636 --> 00:19:32,504
FIRST, THIS IS OUR HOME,

803
00:19:32,504 --> 00:19:33,839
THIS IS THE ONLY HOME WE HAVE,

804
00:19:33,839 --> 00:19:34,706
THERE'S NO OTHER PLANET

805
00:19:34,706 --> 00:19:35,641
THAT WE KNOW OF

806
00:19:35,641 --> 00:19:36,775
THAT CONTAINS LIFE

807
00:19:36,775 --> 00:19:37,776
OR ON WHICH WE CAN LIVE.

808
00:19:37,776 --> 00:19:38,911
>> THAT IS TRUE.

809
00:19:38,911 --> 00:19:39,845
>> EXACTLY, AND-AND

810
00:19:39,845 --> 00:19:40,879
THE SECOND THING,

811
00:19:40,879 --> 00:19:41,813
I DO HAVE A TEENY TINY

812
00:19:41,813 --> 00:19:43,882
BIT OF HOPE IN HUMANITY

813
00:19:43,882 --> 00:19:44,850

THAT WILL CHANGE ITS WAYS

814

00:19:44,850 --> 00:19:46,084

AND, YOU KNOW, KIND OF LIKE

815

00:19:46,084 --> 00:19:47,953

PROBABLY, HOPEFULLY,

816

00:19:47,953 --> 00:19:49,955

UM, CHANGE THE PATH

817

00:19:49,955 --> 00:19:51,290

THAT WE'RE CURRENTLY TAKING

818

00:19:51,290 --> 00:19:51,990

IN REGARDS TO

819

00:19:51,990 --> 00:19:53,659

THE CLIMATE CHANGE.

820

00:19:53,659 --> 00:19:55,027

>> UH, YEAH, I THINK WE ALL

821

00:19:55,027 --> 00:19:55,861

ARE HOLDING ON TO THAT

822

00:19:55,861 --> 00:19:56,695

SPARK OF HOPE AND THAT'S WHY

823

00:19:56,695 --> 00:19:58,163

WE DO WHAT WE DO.

824

00:19:58,163 --> 00:19:59,398

UM, BUT THANK YOU SO MUCH

825

00:19:59,398 --> 00:20:00,332

FOR JOINING US, IVONA,

826
00:20:00,332 --> 00:20:02,100
WE LOVED HAVING YOU.

827
00:20:02,100 --> 00:20:04,836
>> I'M SUPER HAPPY TO BE HERE.

828
00:20:04,836 --> 00:20:06,004
>> REAL WORLD IMPACTS

829
00:20:06,004 --> 00:20:07,039
OF OUR RISING OCEANS

830
00:20:07,039 --> 00:20:08,106
CAN BE SEEN IN COASTAL

831
00:20:08,106 --> 00:20:08,874
COMMUNITIES LIKE

832
00:20:08,874 --> 00:20:10,108
THE HAMPTON ROADS REGION

833
00:20:10,108 --> 00:20:11,944
IN SOUTHEAST VIRGINIA.

834
00:20:11,944 --> 00:20:12,911
LET'S TAKE A LOOK TO SEE

835
00:20:12,911 --> 00:20:14,112
HOW SEA LEVEL RISE

836
00:20:14,112 --> 00:20:15,180
IS DIRECTLY AFFECTING

837
00:20:15,180 --> 00:20:16,081
THEIR COMMUNITY,

838
00:20:16,081 --> 00:20:17,816

AND HOW THEY ARE USING NASA DATA

839

00:20:17,816 --> 00:20:20,419

TO HELP FORECAST FUTURE IMPACTS.

840

00:20:20,419 --> 00:20:21,219

>> SEA LEVEL RISE IS

841

00:20:21,219 --> 00:20:22,220

A MEASURABLE DIFFERENCE

842

00:20:22,220 --> 00:20:23,755

IN WATER LEVEL OVER TIME

843

00:20:23,755 --> 00:20:24,856

AND DIRECTLY CONTRIBUTING

844

00:20:24,856 --> 00:20:25,791

TO THAT IS, OF COURSE,

845

00:20:25,791 --> 00:20:26,858

CLIMATE CHANGE.

846

00:20:26,858 --> 00:20:28,226

SO, AS THE TEMPERATURES RISE,

847

00:20:28,226 --> 00:20:29,861

POLAR ICECAPS MELT,

848

00:20:29,861 --> 00:20:30,829

AND SLOWLY THE WATER LEVEL

849

00:20:30,829 --> 00:20:33,432

RISES THROUGHOUT THE GLOBE.

850

00:20:33,432 --> 00:20:34,666

AND THERE ARE LOCALIZED IMPACTS

851
00:20:34,666 --> 00:20:35,901
OF SEA LEVEL RISE.

852
00:20:35,901 --> 00:20:37,436
>> IN HAMPTON ROADS WE ARE

853
00:20:37,436 --> 00:20:38,370
PARTICULARLY VULNERABLE

854
00:20:38,370 --> 00:20:40,672
TO, UH, COASTAL FLOODING.

855
00:20:40,672 --> 00:20:41,573
>> THE HAMPTON ROADS REGION

856
00:20:41,573 --> 00:20:43,141
OF VIRGINIA IS THE SECOND

857
00:20:43,141 --> 00:20:44,176
MOST HEAVILY IMPACTED

858
00:20:44,176 --> 00:20:45,844
REGION IN THE UNITED STATES

859
00:20:45,844 --> 00:20:46,578
WHEN WE TALK ABOUT

860
00:20:46,578 --> 00:20:47,412
SEA LEVEL RISE,

861
00:20:47,412 --> 00:20:48,914
AFTER OF COURSE, NEW ORLEANS.

862
00:20:48,914 --> 00:20:49,681
>> WE'RE STANDING HERE

863
00:20:49,681 --> 00:20:50,782

AT THE HAGUE PART

864

00:20:50,782 --> 00:20:51,650
OF NORFOLK, VIRGINIA,

865

00:20:51,650 --> 00:20:52,985
WHICH IS IN THE MOUTH

866

00:20:52,985 --> 00:20:53,819
OF THE CHESAPEAKE BAY

867

00:20:53,819 --> 00:20:55,354
IN SOUTHEAST VIRGINIA.

868

00:20:55,354 --> 00:20:56,555
THIS AREA WILL SEE

869

00:20:56,555 --> 00:20:57,956
WHAT WE CALL BLUE SKY FLOODING

870

00:20:57,956 --> 00:20:58,790
QUITE REGULARLY.

871

00:20:58,790 --> 00:20:59,591
WHERE THERE'S-THERE'S

872

00:20:59,591 --> 00:21:00,626
NO STORM EVENT.

873

00:21:00,626 --> 00:21:01,927
AND SO THIS WATER COMES UP

874

00:21:01,927 --> 00:21:03,629
OVER ON TO THIS SIDE,

875

00:21:03,629 --> 00:21:05,063
WATER REACHES THE BULKHEAD,

876

00:21:05,063 --> 00:21:06,632

FLOODS THE AREA AROUND IT,

877

00:21:06,632 --> 00:21:08,400

AND THE ROAD BEHIND ME AS WELL.

878

00:21:08,400 --> 00:21:09,434

>> A LOT OF MY RESEARCH

879

00:21:09,434 --> 00:21:10,302

AT THE VIRGINIA INSTITUTE

880

00:21:10,302 --> 00:21:11,470

OF MARINE SCIENCE

881

00:21:11,470 --> 00:21:12,671

INVOLVES THE DEVELOPMENT

882

00:21:12,671 --> 00:21:13,605

OF PHYSICS-BASED

883

00:21:13,605 --> 00:21:15,407

HYDRODYNAMIC MODELS.

884

00:21:15,407 --> 00:21:16,508

THESE MODELS TELL US

885

00:21:16,508 --> 00:21:17,342

WHERE FLOODING'S GONNA

886

00:21:17,342 --> 00:21:18,510

HAPPEN BEFORE IT DOES,

887

00:21:18,510 --> 00:21:19,978

WHEN, AND FOR HOW LONG.

888

00:21:19,978 --> 00:21:21,313

YOU'LL SEE ALL THESE INDIVIDUAL

889

00:21:21,313 --> 00:21:22,214

STRUCTURES HERE,

890

00:21:22,214 --> 00:21:23,015

MOST OF THEM, YOU KNOW,

891

00:21:23,015 --> 00:21:25,050

THE WATERFRONT ARE INUNDATED.

892

00:21:25,050 --> 00:21:26,284

THE INFORMATION PROVIDED

893

00:21:26,284 --> 00:21:27,486

BY NASA SATELLITES,

894

00:21:27,486 --> 00:21:28,420

MOSTLY ALLOWS US

895

00:21:28,420 --> 00:21:29,755

TO VALIDATE THE ACCURACY

896

00:21:29,755 --> 00:21:30,689

OF OUR MODEL IN TERMS OF

897

00:21:30,689 --> 00:21:32,224

TELLING US WHERE THE FLOODING

898

00:21:32,224 --> 00:21:34,159

ACTUALLY HAPPENED FROM SPACE.

899

00:21:34,159 --> 00:21:35,060

>> THE MAPS THAT COME OUT

900

00:21:35,060 --> 00:21:36,395

OF THE MODELS ARE REALLY USEFUL

901
00:21:36,395 --> 00:21:37,663
AT SHOWING THE DEPTH OF WATER

902
00:21:37,663 --> 00:21:38,463
THROUGHOUT THE CITY

903
00:21:38,463 --> 00:21:39,364
AT THE STREET LEVEL

904
00:21:39,364 --> 00:21:40,532
SO THAT WE CAN, YOU KNOW,

905
00:21:40,532 --> 00:21:41,800
JUST MAKE BETTER DATA-DRIVEN

906
00:21:41,800 --> 00:21:43,268
DECISIONS AROUND THE CITY.

907
00:21:43,268 --> 00:21:44,670
>> THESE ARE TWO STANDARD

908
00:21:44,670 --> 00:21:46,104
ACTIVE REMOTE SENSORS.

909
00:21:46,104 --> 00:21:47,039
>> THIS IS AN EXAMPLE

910
00:21:47,039 --> 00:21:48,507
OF A PRESSURE TRANSDUCER

911
00:21:48,507 --> 00:21:49,808
WATER SENSOR

912
00:21:49,808 --> 00:21:50,876
AND WHAT WE'VE BEEN TRYING

913
00:21:50,876 --> 00:21:52,344

TO DO IS COMPARE DATA

914

00:21:52,344 --> 00:21:53,979

LIKE NASA SATELLITE IMAGERY

915

00:21:53,979 --> 00:21:55,414

TO SEE HOW IT COMPARES

916

00:21:55,414 --> 00:21:56,481

TO THE-THE ACCURACY

917

00:21:56,481 --> 00:21:57,049

THAT WE'RE GETTING

918

00:21:57,049 --> 00:21:57,983

AT THE STREET LEVEL.

919

00:21:57,983 --> 00:21:59,051

SO WHEN YOU PUT IT ALL TOGETHER

920

00:21:59,051 --> 00:22:00,318

IT'S VERY VALUABLE.

921

00:22:00,318 --> 00:22:01,553

>> ONE OF THE MAIN APPLICATIONS

922

00:22:01,553 --> 00:22:02,754

IS REALLY TRYING TO SEE,

923

00:22:02,754 --> 00:22:04,523

UH, BEFORE THESE EVENTS HAPPEN

924

00:22:04,523 --> 00:22:05,590

WHERE IS GONNA BE THE PROBLEM

925

00:22:05,590 --> 00:22:07,225

AREAS IN OUR COMMUNITIES.

926
00:22:07,225 --> 00:22:08,126
>> DETERMINE WHAT ROADS

927
00:22:08,126 --> 00:22:09,127
NEED TO BE CLOSED

928
00:22:09,127 --> 00:22:09,761
OR INTERSECTIONS

929
00:22:09,761 --> 00:22:11,129
NEED TO BE CLOSED WHEN.

930
00:22:11,129 --> 00:22:12,097
>> WHERE THESE PROJECTS

931
00:22:12,097 --> 00:22:13,231
SHOULD BE PERMITTED,

932
00:22:13,231 --> 00:22:14,566
WILL THIS BUILDING LAST

933
00:22:14,566 --> 00:22:15,767
THE THIRTY-YEAR LIFE

934
00:22:15,767 --> 00:22:17,436
OF A STANDARD MORTGAGE?

935
00:22:17,436 --> 00:22:18,170
OUR MODELS,

936
00:22:18,170 --> 00:22:19,571
AS A REPRESENTATION OF REALITY,

937
00:22:19,571 --> 00:22:20,472
HAVE TO BE AS ACCURATE

938
00:22:20,472 --> 00:22:21,339

AS POSSIBLE.

939

00:22:21,339 --> 00:22:22,474

THE ADDITIONAL INFORMATION

940

00:22:22,474 --> 00:22:23,508

FROM THE NASA SATELLITES,

941

00:22:23,508 --> 00:22:24,810

LANDSAT, ASTRO,

942

00:22:24,810 --> 00:22:26,011

AND LOTUS REALLY HELPS US

943

00:22:26,011 --> 00:22:27,546

CALIBRATE OUR MODEL.

944

00:22:27,546 --> 00:22:29,014

>> HAVING THAT REGIONAL WATER

945

00:22:29,014 --> 00:22:30,549

DEPTH MAP REALLY HELPS US

946

00:22:30,549 --> 00:22:31,950

KIND OF HAVE AN UNDERSTANDING

947

00:22:31,950 --> 00:22:33,118

WHAT THE FUTURE DAY TO DAY

948

00:22:33,118 --> 00:22:34,152

LOOKS LIKE IN NORFOLK

949

00:22:34,152 --> 00:22:35,353

WITH SEA LEVEL RISE.

950

00:22:35,353 --> 00:22:36,354

>> IT'S A BETTER UNDERSTANDING,

951
00:22:36,354 --> 00:22:37,255
SEA LEVEL RISE

952
00:22:37,255 --> 00:22:38,390
WILL HELP YOU DECIDE

953
00:22:38,390 --> 00:22:39,357
THE PLACES WHERE YOU MAY WISH

954
00:22:39,357 --> 00:22:40,392
TO WORK OR LIVE

955
00:22:40,392 --> 00:22:41,393
IN THE NEAR FUTURE.

956
00:22:41,393 --> 00:22:42,327
IT ALSO HELPS YOU BETTER

957
00:22:42,327 --> 00:22:43,395
UNDERSTAND SPECIFICALLY

958
00:22:43,395 --> 00:22:44,996
WHAT YOUR RISK IS, UH,

959
00:22:44,996 --> 00:22:46,498
INHERENT NOT JUST WITH FLOODING

960
00:22:46,498 --> 00:22:47,566
BUT ALSO WITH THE CHANGES

961
00:22:47,566 --> 00:22:48,967
TO OUR CLIMATE AS OUR WORLD

962
00:22:48,967 --> 00:22:50,235
CONTINUES TO CHANGE,

963
00:22:50,235 --> 00:22:53,405

EITHER FOR THE BETTER OR WORSE.

964

00:22:53,405 --> 00:22:53,972

>> FROM THE VANTAGE

965

00:22:53,972 --> 00:22:55,207

POINT OF SPACE,

966

00:22:55,207 --> 00:22:56,441

WE ARE ABLE TO MONITOR

967

00:22:56,441 --> 00:22:57,476

AND SEE CHANGES ACROSS

968

00:22:57,476 --> 00:22:59,177

OUR PLANET AND COMPARE

969

00:22:59,177 --> 00:23:00,645

DATA OVER TIME.

970

00:23:00,645 --> 00:23:01,480

JOINING US NOW

971

00:23:01,480 --> 00:23:03,281

IS DR. NACER CHAHAT,

972

00:23:03,281 --> 00:23:04,583

SWOT PAYLOAD SYSTEMS

973

00:23:04,583 --> 00:23:05,383

ENGINEER LEAD

974

00:23:05,383 --> 00:23:06,318

WHO'S GOING TO TELL US MORE

975

00:23:06,318 --> 00:23:07,753

ABOUT HOW WE STUDY OCEANS

976
00:23:07,753 --> 00:23:08,887
FROM SPACE.

977
00:23:08,887 --> 00:23:10,589
THANK YOU FOR JOINING US.

978
00:23:10,589 --> 00:23:12,324
>> THANK YOU FOR HAVING ME.

979
00:23:12,324 --> 00:23:13,759
>> IT'S A PLEASURE TO HAVE YOU.

980
00:23:13,759 --> 00:23:15,494
SO, UH, LET'S GET INTO IT.

981
00:23:15,494 --> 00:23:16,695
WE KNOW THAT NASA USES

982
00:23:16,695 --> 00:23:18,630
SATELLITES TO STUDY OUR PLANET,

983
00:23:18,630 --> 00:23:19,631
UM, BUT COULD YOU GIVE US

984
00:23:19,631 --> 00:23:20,565
A BETTER IDEA

985
00:23:20,565 --> 00:23:21,600
OF HOW THESE SPACECRAFT

986
00:23:21,600 --> 00:23:23,769
ACTUALLY WORK, SPECIFICALLY,

987
00:23:23,769 --> 00:23:27,105
UH, SENTINEL-6 MICHAEL FREILICH?

988
00:23:27,105 --> 00:23:27,606

>> YEAH, SO NASA

989

00:23:27,606 --> 00:23:29,407
HAS A WIDE RANGE OF, UH,

990

00:23:29,407 --> 00:23:30,575
EARTH SCIENCE SATELLITES

991

00:23:30,575 --> 00:23:31,977
THAT ACTUALLY STUDY EARTH

992

00:23:31,977 --> 00:23:33,311
IN VERY DIFFERENT WAYS.

993

00:23:33,311 --> 00:23:34,012
>> RIGHT.

994

00:23:34,012 --> 00:23:34,646
>> UH, BUT FIRST I WOULD

995

00:23:34,646 --> 00:23:35,614
LIKE TO START BY SAYING

996

00:23:35,614 --> 00:23:36,581
THAT WE ARE NOT RELYING

997

00:23:36,581 --> 00:23:37,883
ON OPTICAL MEASUREMENTS

998

00:23:37,883 --> 00:23:38,884
BECAUSE THEY CAN BE IMPAIRED

999

00:23:38,884 --> 00:23:40,986
BY THE WEATHER CONDITIONS

1000

00:23:40,986 --> 00:23:42,354
OR EVEN BY CLOUDS

1001
00:23:42,354 --> 00:23:43,622
OR WHETHER WE'RE

1002
00:23:43,622 --> 00:23:44,790
IN THE DAY OR NIGHT.

1003
00:23:44,790 --> 00:23:46,658
SO INSTEAD WE ARE MAINLY USING

1004
00:23:46,658 --> 00:23:48,393
MICROWAVE INSTRUMENTS,

1005
00:23:48,393 --> 00:23:49,427
WHICH ARE NOT BEING

1006
00:23:49,427 --> 00:23:50,829
AFFECTED BY THESE, UH,

1007
00:23:50,829 --> 00:23:52,664
CONDITIONS OR WHETHER,

1008
00:23:52,664 --> 00:23:54,499
UH, IT'S THE DAY OR NIGHT.

1009
00:23:54,499 --> 00:23:56,668
SO SENTINEL-6 SPECIFICALLY,

1010
00:23:56,668 --> 00:23:59,571
UH, USES TWO MAIN INSTRUMENTS.

1011
00:23:59,571 --> 00:24:00,572
UH, THE FIRST ONE

1012
00:24:00,572 --> 00:24:01,373
IS THE ALTIMETER,

1013
00:24:01,373 --> 00:24:02,307

WHICH IS AN ACTIVE,

1014

00:24:02,307 --> 00:24:03,842

UH, INSTRUMENT.

1015

00:24:03,842 --> 00:24:04,843

UH, ACTIVE INSTRUMENT

1016

00:24:04,843 --> 00:24:05,677

MEANS THAT IT ACTUALLY

1017

00:24:05,677 --> 00:24:07,212

TRANSMITS POWER,

1018

00:24:07,212 --> 00:24:08,413

PASSIVE INSTRUMENT MEANS

1019

00:24:08,413 --> 00:24:09,481

THAT IT'S ONLY LOOKING AT

1020

00:24:09,481 --> 00:24:10,849

WHAT'S COMING AT IT.

1021

00:24:10,849 --> 00:24:13,451

UH, SO, UH, THE ALTIMETER

1022

00:24:13,451 --> 00:24:15,120

ACTUALLY SENDS A PULSE,

1023

00:24:15,120 --> 00:24:16,888

THE PULSE GOES AND BOUNCES

1024

00:24:16,888 --> 00:24:18,423

BACK THE SURFACE OF EARTH,

1025

00:24:18,423 --> 00:24:19,124

AND COMES BACK

1026
00:24:19,124 --> 00:24:20,325
TO THE INSTRUMENTS.

1027
00:24:20,325 --> 00:24:22,294
SO WE KNOW THE PRICE-PRECISE

1028
00:24:22,294 --> 00:24:24,162
ORBIT OF THE SATELLITES,

1029
00:24:24,162 --> 00:24:25,263
AND WE ALSO KNOW

1030
00:24:25,263 --> 00:24:26,364
HOW LONG IT ACTUALLY TOOK

1031
00:24:26,364 --> 00:24:27,766
FOR THESE, UH,

1032
00:24:27,766 --> 00:24:29,334
PULSE TO TRAVEL BACK AND FORTH.

1033
00:24:29,334 --> 00:24:30,302
AND SO WE CAN ACTUALLY

1034
00:24:30,302 --> 00:24:31,570
EXTRACT THE SURFACE HEIGHT

1035
00:24:31,570 --> 00:24:33,104
BY DOING SO.

1036
00:24:33,104 --> 00:24:34,439
UH, HOWEVER IT'S A LITTLE

1037
00:24:34,439 --> 00:24:36,842
BIT TINY, UH, MORE COMPLEX

1038
00:24:36,842 --> 00:24:38,777

THAN THAT BECAUSE THESE PULSE

1039

00:24:38,777 --> 00:24:40,478

CAN ACTUALLY BE SLOWED DOWN

1040

00:24:40,478 --> 00:24:41,780

BY THE ATMOSPHERE.

1041

00:24:41,780 --> 00:24:42,848

SO AS A RESULT

1042

00:24:42,848 --> 00:24:44,282

WE HAVE A RADIOMETER,

1043

00:24:44,282 --> 00:24:45,517

WHICH IS A PASSIVE INSTRUMENT

1044

00:24:45,517 --> 00:24:47,419

THAT IS ONLY LOOKING AT

1045

00:24:47,419 --> 00:24:48,820

SPECIFIC FREQUENCIES

1046

00:24:48,820 --> 00:24:51,056

AND POWER, UH, COMING AT IT,

1047

00:24:51,056 --> 00:24:52,657

WHICH ALLOWS US TO KNOW,

1048

00:24:52,657 --> 00:24:54,025

UH, HOW THIS PULSE

1049

00:24:54,025 --> 00:24:54,993

IS BEING AFFECTED.

1050

00:24:54,993 --> 00:24:56,628

SO THAT ALLOWS US TO CALIBRATE

1051
00:24:56,628 --> 00:24:57,295
THE RESULT THAT WE'RE

1052
00:24:57,295 --> 00:24:58,897
GETTING FORM THE ALTIMETER,

1053
00:24:58,897 --> 00:24:59,764
ALLOWING US TO GET

1054
00:24:59,764 --> 00:25:01,266
A VERY PRECISE MEASUREMENT

1055
00:25:01,266 --> 00:25:02,534
OF THE SURFACE HEIGHT.

1056
00:25:02,534 --> 00:25:05,537
THAT'S HOW SENTINEL-6 WORKS.

1057
00:25:05,537 --> 00:25:06,738
>> WOW, I HEAR THAT

1058
00:25:06,738 --> 00:25:07,672
AND JUST THINK,

1059
00:25:07,672 --> 00:25:09,374
WE'VE GOT A LOT OF INCREDIBLY

1060
00:25:09,374 --> 00:25:10,375
SMART ENGINEERS WORKING

1061
00:25:10,375 --> 00:25:12,077
FOR TEAM NASA, YOURSELF

1062
00:25:12,077 --> 00:25:13,278
OBVIOUSLY, INCLUDED.

1063
00:25:13,278 --> 00:25:14,346

[CHUCKLING]

1064

00:25:14,346 --> 00:25:15,380

UM, SO ONE THING THAT

1065

00:25:15,380 --> 00:25:16,014

I'VE THOUGHT ABOUT

1066

00:25:16,014 --> 00:25:16,748

AND MAYBE OTHERS HAVE

1067

00:25:16,748 --> 00:25:18,416

THOUGHT ABOUT THIS TOO IS THAT,

1068

00:25:18,416 --> 00:25:19,317

UM, IF THE OCEAN

1069

00:25:19,317 --> 00:25:20,652

IS CONSTANTLY MOVING

1070

00:25:20,652 --> 00:25:22,120

AND CONSTANTLY CHANGING,

1071

00:25:22,120 --> 00:25:23,521

HOW ARE WE ABLE TO CAPTURE

1072

00:25:23,521 --> 00:25:26,024

ACCURATE MEASUREMENTS?

1073

00:25:26,024 --> 00:25:26,791

>> THAT'S ACTUALLY A GREAT

1074

00:25:26,791 --> 00:25:27,993

QUESTION AND MY FRIENDS

1075

00:25:27,993 --> 00:25:29,294

CONSISTENTLY ASK ME

1076

00:25:29,294 --> 00:25:30,161

THE SAME QUESTION.

1077

00:25:30,161 --> 00:25:31,396

SO TRYING TO ANSWER

1078

00:25:31,396 --> 00:25:32,430

THAT QUESTION ALL THE TIME

1079

00:25:32,430 --> 00:25:33,798

I REALIZE THAT IT'S BECAUSE

1080

00:25:33,798 --> 00:25:35,267

PEOPLE HAVE IN MIND THE FACT

1081

00:25:35,267 --> 00:25:35,867

THAT WE'RE LOOKING

1082

00:25:35,867 --> 00:25:37,202

AT A SINGLE POINT,

1083

00:25:37,202 --> 00:25:38,336

SO IF YOU'RE LOOKING AT A SINGLE

1084

00:25:38,336 --> 00:25:40,171

POINT THAT IS CONSTANTLY MOVING,

1085

00:25:40,171 --> 00:25:40,906

SO OF COURSE IT

1086

00:25:40,906 --> 00:25:42,307

MAKES IT VERY DIFFICULT.

1087

00:25:42,307 --> 00:25:44,409

HOWEVER, WHAT THE, UH,

1088

00:25:44,409 --> 00:25:45,377

ALTIMETER IS ACTUALLY

1089

00:25:45,377 --> 00:25:47,245

LOOKING IS A FOOTPRINT,

1090

00:25:47,245 --> 00:25:48,446

UM, AT THE SURFACE--

1091

00:25:48,446 --> 00:25:50,081

ON, UH, ON THE OCEAN

1092

00:25:50,081 --> 00:25:52,050

THAT IS ACTUALLY QUITE LARGE,

1093

00:25:52,050 --> 00:25:53,318

UH, SEVERAL KILOMETERS,

1094

00:25:53,318 --> 00:25:55,253

SO AS A RESULT, SMALL VARIATION,

1095

00:25:55,253 --> 00:25:57,822

UH-UH, AS A RESULT OF WAVES

1096

00:25:57,822 --> 00:25:58,623

AND THINGS LIKE THAT

1097

00:25:58,623 --> 00:25:59,724

WILL NOT REALLY AFFECT

1098

00:25:59,724 --> 00:26:00,792

THESE RESULTS SINCE WE'RE

1099

00:26:00,792 --> 00:26:02,794

AVERAGE-AVERAGING OVER

1100

00:26:02,794 --> 00:26:05,063

SUCH A LARGE, UH, AREA.

1101
00:26:05,063 --> 00:26:06,665
AND ALSO I SHOULD ADD TO THAT,

1102
00:26:06,665 --> 00:26:08,233
THAT THE OTHER, UH,

1103
00:26:08,233 --> 00:26:10,769
SPECIAL-SPECIAL, UH,

1104
00:26:10,769 --> 00:26:11,703
TEMPORAL RESOLUTION

1105
00:26:11,703 --> 00:26:12,771
IS REALLY WHAT WE CARE ABOUT.

1106
00:26:12,771 --> 00:26:14,606
SO, UH, SENTINEL-6

1107
00:26:14,606 --> 00:26:15,840
WILL BE ABLE TO COVER

1108
00:26:15,840 --> 00:26:17,275
THE ENTIRE MAP, UH,

1109
00:26:17,275 --> 00:26:20,011
OF ACTUALLY 95% OF THE MAP

1110
00:26:20,011 --> 00:26:20,912
OF THE GLOBE,

1111
00:26:20,912 --> 00:26:22,380
UH, EVERY TEN DAYS.

1112
00:26:22,380 --> 00:26:23,315
SO WE'LL BE ABLE

1113
00:26:23,315 --> 00:26:24,616

TO GET THIS DATA POINT

1114

00:26:24,616 --> 00:26:26,017

EVERY, UH, TEN DAYS

1115

00:26:26,017 --> 00:26:27,852

FOR A DURATION OF THE MISSION

1116

00:26:27,852 --> 00:26:29,054

WHICH IS FIVE YEARS,

1117

00:26:29,054 --> 00:26:30,322

UNTIL THE NEXT SATELLITE GOES

1118

00:26:30,322 --> 00:26:31,289

AND IT'S GONNA BE FIVE YEARS

1119

00:26:31,289 --> 00:26:32,424

AT ALL, UH, AGAIN.

1120

00:26:32,424 --> 00:26:33,425

SO THE SCIENTISTS

1121

00:26:33,425 --> 00:26:35,360

ARE LOOKING AT A VERY,

1122

00:26:35,360 --> 00:26:37,128

UH-UH CHANGES OVER A LARGE,

1123

00:26:37,128 --> 00:26:38,797

UH-UH, AMOUNT OF TIME,

1124

00:26:38,797 --> 00:26:40,231

SO, MANY YEARS.

1125

00:26:40,231 --> 00:26:41,166

>> RIGHT, YEAH,

1126

00:26:41,166 --> 00:26:42,667

SO IT'S NOT-IT'S NOT JUST

1127

00:26:42,667 --> 00:26:44,903

ABOUT ONE WAVE AT ONE MOMENT,

1128

00:26:44,903 --> 00:26:46,471

IT'S ABOUT, YOU KNOW,

1129

00:26:46,471 --> 00:26:47,806

UH-UH THE BIG PICTURE

1130

00:26:47,806 --> 00:26:49,607

OVER A LONG PERIOD OF TIME--

1131

00:26:49,607 --> 00:26:50,275

>> EXACTLY.

1132

00:26:50,275 --> 00:26:50,775

>> --ON AVERAGE.

1133

00:26:50,775 --> 00:26:51,309

>> YEAH.

1134

00:26:51,309 --> 00:26:52,344

>> YEAH, THAT MAKES TOTAL SENSE.

1135

00:26:52,344 --> 00:26:53,211

YEAH, SO NOW I WANNA

1136

00:26:53,211 --> 00:26:54,112

TALK ABOUT SOMETHING

1137

00:26:54,112 --> 00:26:55,013

THAT'S PROBABLY VERY NEAR

1138

00:26:55,013 --> 00:26:56,681

AND DEAR TO YOUR HEART.

1139

00:26:56,681 --> 00:26:57,649

WE'VE BEEN TALKING A LOT ABOUT

1140

00:26:57,649 --> 00:26:59,417

NASA'S NEXT OCEAN MONITORING

1141

00:26:59,417 --> 00:27:01,186

SYSTEM, SENTINEL-6,

1142

00:27:01,186 --> 00:27:03,621

UM, BUT I UNDERSTAND

1143

00:27:03,621 --> 00:27:04,589

YOU'RE ACTUALLY WORKING ON

1144

00:27:04,589 --> 00:27:05,657

A NEW EARTH OBSERVING

1145

00:27:05,657 --> 00:27:07,525

MISSION CALLED SWOT.

1146

00:27:07,525 --> 00:27:08,827

AND BEFORE WE GET INTO YOU

1147

00:27:08,827 --> 00:27:10,328

TELLING US WHAT SWOT IS ABOUT,

1148

00:27:10,328 --> 00:27:11,396

CAN YOU ACTUALLY TELL US

1149

00:27:11,396 --> 00:27:13,765

WHAT THAT ACRONYM MEANS?

1150

00:27:13,765 --> 00:27:15,633

>> YES, SO SWOT MEANS SURFACE,

1151
00:27:15,633 --> 00:27:17,602
WATER, OCEAN, TOPOGRAPHY.

1152
00:27:17,602 --> 00:27:18,370
>> OKAY.

1153
00:27:18,370 --> 00:27:19,337
>> AND TOPOGRAPHY IS A FANCY

1154
00:27:19,337 --> 00:27:21,940
WORD TO DEFINE THE STUDY

1155
00:27:21,940 --> 00:27:23,641
OF THE SHAPE OF, UH,

1156
00:27:23,641 --> 00:27:24,976
WHAT WE'RE LOOKING AT.

1157
00:27:24,976 --> 00:27:25,677
>> OKAY, GOT IT.

1158
00:27:25,677 --> 00:27:26,845
>> AND SO THE WAY SWOT WORKS,

1159
00:27:26,845 --> 00:27:28,313
UH, IT'S BASICALLY,

1160
00:27:28,313 --> 00:27:29,681
WE'RE USING THE SAME INSTRUMENT

1161
00:27:29,681 --> 00:27:31,016
THAT SENTINEL-6 IS USING,

1162
00:27:31,016 --> 00:27:32,717
SO IT CARRIES A-A-A LARGE

1163
00:27:32,717 --> 00:27:34,586

HERITAGE FROM SENTINEL-6

1164

00:27:34,586 --> 00:27:35,653

AND THE JASON SERIES,

1165

00:27:35,653 --> 00:27:36,921

UH, SATELLITES.

1166

00:27:36,921 --> 00:27:38,490

UH, BUT ON TOP OF THE ALTIMETER

1167

00:27:38,490 --> 00:27:39,557

AND THE RADIOMETER

1168

00:27:39,557 --> 00:27:40,592

AND ALL THE INSTRUMENTS

1169

00:27:40,592 --> 00:27:42,427

TO-TO PROVIDE A PRECISE

1170

00:27:42,427 --> 00:27:43,962

ORBIT, UH, MEASUREMENT

1171

00:27:43,962 --> 00:27:45,196

OF THE SATELLITE,

1172

00:27:45,196 --> 00:27:46,031

WE'LL ALSO HAVE A VERY,

1173

00:27:46,031 --> 00:27:47,532

VERY FANCY RADAR.

1174

00:27:47,532 --> 00:27:48,266

I'M NOT GONNA GO

1175

00:27:48,266 --> 00:27:48,900

INTO THE DETAILS

1176

00:27:48,900 --> 00:27:50,668

ON HOW THIS, UH-UH-UH,

1177

00:27:50,668 --> 00:27:53,304

RADAR WORKS, BUT UH,

1178

00:27:53,304 --> 00:27:54,339

WHAT YOU NEED TO TAKE OUT

1179

00:27:54,339 --> 00:27:55,673

OF THAT IS THAT THIS,

1180

00:27:55,673 --> 00:27:57,442

UH, FANCY RADAR, UH,

1181

00:27:57,442 --> 00:27:58,977

ALLOWS US TO GET INLAND

1182

00:27:58,977 --> 00:28:00,779

MEASUREMENTS, AND ALSO,

1183

00:28:00,779 --> 00:28:01,846

UH, FOR THE FIRST TIME,

1184

00:28:01,846 --> 00:28:02,914

THAT'S GONNA BE THE FIRST TIME

1185

00:28:02,914 --> 00:28:04,015

A SATELLITE WILL BE ABLE

1186

00:28:04,015 --> 00:28:04,883

TO GET INLAND

1187

00:28:04,883 --> 00:28:05,950

WATER MEASUREMENTS.

1188

00:28:05,950 --> 00:28:07,318

>> THAT'S-THAT'S HUGE.

1189

00:28:07,318 --> 00:28:08,119

>> YES.

1190

00:28:08,119 --> 00:28:09,954

AND ALSO, IT WILL BE ABLE

1191

00:28:09,954 --> 00:28:12,123

TO GIVE US, UH,

1192

00:28:12,123 --> 00:28:12,957

INFORMATION ABOUT

1193

00:28:12,957 --> 00:28:14,926

THE CURRENTS ON THE OCEAN.

1194

00:28:14,926 --> 00:28:17,028

UH, AND ON TOP OF THAT,

1195

00:28:17,028 --> 00:28:18,196

WILL GIVE US A BETTER

1196

00:28:18,196 --> 00:28:19,631

RANGE RESOLUTION, UH,

1197

00:28:19,631 --> 00:28:20,365

AND DISCRIMINATION

1198

00:28:20,365 --> 00:28:21,633

OF A FEW METERS.

1199

00:28:21,633 --> 00:28:23,168

SO WE'RE PUSHING THE LIMITS

1200

00:28:23,168 --> 00:28:25,437

OF WHAT WE'RE CAPABLE OF, UH,

1201
00:28:25,437 --> 00:28:27,372
DOING WITH CURRENT SATELLITES,

1202
00:28:27,372 --> 00:28:28,673
UH, EVERY TIME.

1203
00:28:28,673 --> 00:28:29,340
SO SATELLITE'S

1204
00:28:29,340 --> 00:28:30,442
A GOOD EXAMPLE OF THAT,

1205
00:28:30,442 --> 00:28:31,109
WE'RE ALWAYS PUSHING

1206
00:28:31,109 --> 00:28:31,643
THE BOUNDARIES

1207
00:28:31,643 --> 00:28:34,412
OF WHAT WE CAN DO.

1208
00:28:34,412 --> 00:28:35,480
>> WELL YOU HEARD IT HERE,

1209
00:28:35,480 --> 00:28:36,347
FOLKS, UH, OUR TEAM

1210
00:28:36,347 --> 00:28:37,515
IS PRODUCING THE LATEST

1211
00:28:37,515 --> 00:28:38,149
AND GREATEST WITH

1212
00:28:38,149 --> 00:28:39,117
WHATEVER THEY DO,

1213
00:28:39,117 --> 00:28:41,152

AND RIGHT NOW IT HAPPENS TO BE

1214

00:28:41,152 --> 00:28:42,187

AN AMAZING OCEAN

1215

00:28:42,187 --> 00:28:43,655

MONITORING SYSTEM.

1216

00:28:43,655 --> 00:28:44,923

UM, BUT THAT'S ABOUT

1217

00:28:44,923 --> 00:28:46,357

ALL THE TIME WE HAVE.

1218

00:28:46,357 --> 00:28:47,659

THANK YOU SO MUCH, NACER,

1219

00:28:47,659 --> 00:28:49,027

FOR JOINING US.

1220

00:28:49,027 --> 00:28:50,295

>> THANK YOU FOR HAVING ME.

1221

00:28:50,295 --> 00:28:51,429

MY PLEASURE.

1222

00:28:51,429 --> 00:28:52,230

>> AND THANK YOU

1223

00:28:52,230 --> 00:28:53,865

FOR JOINING US AT HOME.

1224

00:28:53,865 --> 00:28:54,933

IF YOU WOULD LIKE TO LEARN MORE

1225

00:28:54,933 --> 00:28:56,067

ABOUT OUR GLOBAL OCEAN

1226
00:28:56,067 --> 00:28:57,068
AND SEA LEVEL RISE

1227
00:28:57,068 --> 00:28:58,536
RESEARCH AT NASA,

1228
00:28:58,536 --> 00:28:59,437
PLEASE HEAD OVER TO

1229
00:28:59,437 --> 00:29:02,140
SEALEVEL.NASA.GOV.

1230
00:29:02,140 --> 00:29:03,308
FOR MORE INFORMATION ABOUT

1231
00:29:03,308 --> 00:29:04,742
THE SENTINEL-6 MICHAEL FREILICH

1232
00:29:04,742 --> 00:29:06,478
SATELLITE AND SEA LEVEL RISE,

1233
00:29:06,478 --> 00:29:07,645
AND FOR WAYS TO WATCH

1234
00:29:07,645 --> 00:29:09,114
THE LAUNCH WITH US,

1235
00:29:09,114 --> 00:29:10,682
FOLLOW @NASAEARTH ON

1236
00:29:10,682 --> 00:29:12,050
TWITTER AND FACEBOOK.