Panelists

Attendees (19)

- Hosts (2)
  - Estelle Dodson
  - Marco Boldt
- Presenters (3)
  - Doug Whittet
  - Greg Springsteen
  - Jamie Elsila
- Participants (14)
  - Bill Irvine
  - Cynthia Dinwiddie...
  - David Lomas
  - David Woon
  - Emily Hardegree-...
  - Glenn Ciolek
  - John Rummel
  - Lindsay Hays
  - Nicolle
  - Pauline Schwartz
  - Ray Menzel
  - Sara Walker
  - Shawn Domagal-G...

Open Chat (Everyone)

--------- (09/26/2013 11:00) ---------

David Lomas:
http://www.youtube.com/watch?v=YY8oMBRMUIc

Teleconference Instructions (Parti...

Teleconference Line: 866-692-3158
Passcode: 9109668#
Please use *6 to MUTE your phone's mic when not speaking.
More info: https://astrobiologyfuture.org

organic monomer webinar.pptx

Full Screen

Subquestion 3

What are the primary mechanisms for organic formation in various environments, and what relative abundances of organics are produced?

Organic formation can occur in many environments, including the ISM, protoplanetary disks, parent bodies, planetary atmospheres, and planetary environments such as hydrothermal vents. Different formation pathways exist in each of these environments, producing different organic compounds; understanding these pathways and the distributions of compounds formed sheds light on the inventory of organics present for the origination of life.

1
00:00:12,430 --> 00:00:10,940
hi everyone it's David Lomas here from

2
00:00:15,230 --> 00:00:12,440
no innovation i'm just going to

3
00:00:16,340 --> 00:00:15,240
introduce the presenters tonight and

4
00:00:20,779 --> 00:00:16,350
just give you a bit of an overview of

5
00:00:22,550 --> 00:00:20,789
what's what the plan is i see probably

6
00:00:25,880 --> 00:00:22,560
two-thirds of people did see the

7
00:00:27,890 --> 00:00:25,890
introductory session last week for those

8
00:00:30,230 --> 00:00:27,900
of you who didn't there is a recording

9
00:00:32,540 --> 00:00:30,240
of it available which is i just put a

10
00:00:33,650 --> 00:00:32,550
link in the chat window there if you

11
00:00:35,660 --> 00:00:33,660
want to go and have a look that's the

12
00:00:40,280 --> 00:00:35,670
full version i'm going to give you the

13
00:00:41,569 --> 00:00:40,290

30 second version which is as a result

14
00:00:42,799 --> 00:00:41,579
of the work that's been done so far a

15
00:00:46,310 --> 00:00:42,809
whole load of these documents were

16
00:00:48,229 --> 00:00:46,320
produced and the subject for tonight's

17
00:00:50,799 --> 00:00:48,239
is as you can see on there on the right

18
00:00:53,479 --> 00:00:50,809
there to do with organic monomers and

19
00:00:55,880 --> 00:00:53,489
Jamie and Gregor gunner and Doug are

20
00:00:58,520 --> 00:00:55,890
going to walk us through that document

21
00:01:00,920 --> 00:00:58,530
in a second the document is a google doc

22
00:01:03,920 --> 00:01:00,930
and you will be able to comment directly

23
00:01:06,140 --> 00:01:03,930
in the document once the webinar is

24
00:01:08,179 --> 00:01:06,150
finished so we'll open those documents

25
00:01:10,310 --> 00:01:08,189
up there are guidelines on the

26
00:01:13,280 --> 00:01:10,320
astrobiology future dot org website

27
00:01:14,570 --> 00:01:13,290
about how the commenting shouldn't go so

28
00:01:17,530 --> 00:01:14,580
L please go and have a look at that

29
00:01:19,730 --> 00:01:17,540
after the webinar this is the second one

30
00:01:21,530 --> 00:01:19,740
and there are quite a few in the diary

31
00:01:24,830 --> 00:01:21,540
all the dates are available on the

32
00:01:28,940 --> 00:01:24,840
website so we can you can go and have a

33
00:01:31,249 --> 00:01:28,950
look and check up on those the format

34
00:01:34,490 --> 00:01:31,259
for this evening really is 10-15 minutes

35
00:01:36,170 --> 00:01:34,500
presentation from the guys there and

36
00:01:38,719 --> 00:01:36,180
then we'll open it up to any discussion

37
00:01:40,850 --> 00:01:38,729
or questions that people have so as

38
00:01:42,499 --> 00:01:40,860

you're listening and watching this

39
00:01:44,960 --> 00:01:42,509
evening if you've got any thoughts or

40
00:01:46,880 --> 00:01:44,970
comments or questions you want to bring

41
00:01:49,550 --> 00:01:46,890
up towards the end then either just make

42
00:01:52,090 --> 00:01:49,560
a note or you can always type stuff

43
00:01:54,920 --> 00:01:52,100
straight into the chat window here and

44
00:01:57,289 --> 00:01:54,930
myself and marker will do our best to

45
00:01:58,700 --> 00:01:57,299
kind of organize those a little bit so

46
00:02:01,819 --> 00:01:58,710
the presenters can respond to them

47
00:02:04,069 --> 00:02:01,829
afterwards and you can always you can

48
00:02:05,480 --> 00:02:04,079
also use the raise hand feature which is

49
00:02:07,670 --> 00:02:05,490
at the top of the screen on the left

50
00:02:10,940 --> 00:02:07,680
hand side there if there's anything you

51
00:02:12,320 --> 00:02:10,950
want to say towards the end other than

52
00:02:13,760 --> 00:02:12,330
that the only thing to mention which I

53
00:02:15,200 --> 00:02:13,770
think Marco already

54
00:02:16,610 --> 00:02:15,210
suggested we are recording all these

55
00:02:18,380 --> 00:02:16,620
sessions tonight so when we opened up

56
00:02:21,560 --> 00:02:18,390
for conversation that will also be part

57
00:02:23,240 --> 00:02:21,570
of the recording and other than that I

58
00:02:26,360 --> 00:02:23,250
think we should be good to go so I don't

59
00:02:29,090 --> 00:02:26,370
know Greg Jamie Doug I don't know who

60
00:02:31,040 --> 00:02:29,100
was going to kick off this evening I'm

61
00:02:32,630 --> 00:02:31,050
going to give a little introduction and

62
00:02:34,310 --> 00:02:32,640
then we're going to split up talking

63
00:02:35,750 --> 00:02:34,320

about the sub questions of the document

64
00:02:37,190 --> 00:02:35,760
and then I'll do a little wrap-up and

65
00:02:39,860 --> 00:02:37,200
then hopefully we'll get a lot of

66
00:02:41,780 --> 00:02:39,870
discussion from the participant Britain

67
00:02:43,340 --> 00:02:41,790
okay thanks Jamie so if anybody has any

68
00:02:45,500 --> 00:02:43,350
questions before we go just throw them

69
00:02:47,540 --> 00:02:45,510
up in the chat window but assuming rule

70
00:02:49,820 --> 00:02:47,550
we're all good to go I'll hand over to

71
00:02:51,980 --> 00:02:49,830
you Jamie okay so I just want to

72
00:02:53,330 --> 00:02:51,990
reiterate that making this roadmap is

73
00:02:55,820 --> 00:02:53,340
supposed to be community driven and

74
00:02:57,470 --> 00:02:55,830
community supported and this document

75
00:02:59,240 --> 00:02:57,480
that we're presenting today is the

76
00:03:01,100 --> 00:02:59,250
product of a small group of authors with

77
00:03:03,290 --> 00:03:01,110
comments from a slightly larger group

78
00:03:05,360 --> 00:03:03,300
but we're really considering it still a

79
00:03:08,060 --> 00:03:05,370
draft or just talking about how it needs

80
00:03:09,530 --> 00:03:08,070
some more edits and comments to probably

81
00:03:12,620 --> 00:03:09,540
reorganize things and to make sure that

82
00:03:15,620 --> 00:03:12,630
we haven't missed any important topic

83
00:03:17,660 --> 00:03:15,630
points here so we really hope they will

84
00:03:19,610 --> 00:03:17,670
get some good comments and conversation

85
00:03:21,410 --> 00:03:19,620
going from this but the question that

86
00:03:23,300 --> 00:03:21,420
we're focusing on in this document is

87
00:03:25,160 --> 00:03:23,310
what are the sources of organic monomers

88
00:03:27,680 --> 00:03:25,170

relevant to the origin of life so

89
00:03:31,520 --> 00:03:27,690
particularly the abiotic sources of the

90
00:03:34,130 --> 00:03:31,530
ingredients that we need for life and a

91
00:03:36,590 --> 00:03:34,140
little bit more a little more

92
00:03:39,080 --> 00:03:36,600
explanation of where this topic came

93
00:03:40,940 --> 00:03:39,090
from we were coming at it from thinking

94
00:03:42,949 --> 00:03:40,950
that the first step in the formation of

95
00:03:44,900 --> 00:03:42,959
organic life is the formation of simple

96
00:03:46,400 --> 00:03:44,910
organic compounds you need to have the

97
00:03:48,860 --> 00:03:46,410
ingredients the building blocks before

98
00:03:51,380 --> 00:03:48,870
life can get started and there's a lot

99
00:03:53,510 --> 00:03:51,390
of different sources for these monomers

100
00:03:55,640 --> 00:03:53,520
for the simple organic compounds both

101
00:03:57,350 --> 00:03:55,650
exogenous sources off of the earth and

102
00:03:59,510 --> 00:03:57,360
endogenous sources on the early Earth

103
00:04:02,000 --> 00:03:59,520
and we lifted a variety of potential

104
00:04:03,340 --> 00:04:02,010
environments that are worthy of studying

105
00:04:05,840 --> 00:04:03,350
like the interstellar medium

106
00:04:07,990 --> 00:04:05,850
protoplanetary disks comets asteroids

107
00:04:10,610 --> 00:04:08,000
current bodies planetary atmospheres and

108
00:04:12,560 --> 00:04:10,620
planetary environment and i will say

109
00:04:14,000 --> 00:04:12,570
that i think that the author group that

110
00:04:17,330 --> 00:04:14,010
worked on this with a little biased

111
00:04:19,580 --> 00:04:17,340
towards these sources we didn't have a

112
00:04:22,400 --> 00:04:19,590
lot of examples given in this document

113
00:04:24,500 --> 00:04:22,410

right now of planetary environments that

114
00:04:26,400 --> 00:04:24,510
we want to study we tend to say

115
00:04:27,920 --> 00:04:26,410
hydrothermal vents a lot which

116
00:04:31,800 --> 00:04:27,930
probably need to include some other

117
00:04:33,270 --> 00:04:31,810
planetary environments as well but so

118
00:04:37,320 --> 00:04:33,280
the idea is we're looking at all these

119
00:04:40,380 --> 00:04:37,330
sources of organic monomers and a little

120
00:04:41,940 --> 00:04:40,390
bit more justification for this we

121
00:04:43,950 --> 00:04:41,950
really are interested in understanding

122
00:04:45,570 --> 00:04:43,960
the inventory of ingredients the

123
00:04:48,300 --> 00:04:45,580
building blocks that were present when

124
00:04:50,190 --> 00:04:48,310
life originated and they can form in a

125
00:04:51,840 --> 00:04:50,200
variety of environments and in the

126
00:04:53,820 --> 00:04:51,850
environment self form and different

127
00:04:55,650 --> 00:04:53,830
distributions different compound groups

128
00:04:58,230 --> 00:04:55,660
might form under different conditions

129
00:05:00,240 --> 00:04:58,240
and we really want to understand this to

130
00:05:02,430 --> 00:05:00,250
help us not only understand the origin

131
00:05:04,290 --> 00:05:02,440
of life on the early Earth but also to

132
00:05:06,660 --> 00:05:04,300
help constrain environments that we

133
00:05:08,910 --> 00:05:06,670
might look at elsewhere to understand

134
00:05:10,560 --> 00:05:08,920
where life could originate and there's

135
00:05:13,110 --> 00:05:10,570
this comment at the bottom of the

136
00:05:14,700 --> 00:05:13,120
justification thing that we only know

137
00:05:16,110 --> 00:05:14,710
that life was able to originate on earth

138
00:05:17,490 --> 00:05:16,120

under the conditions about

139
00:05:19,170 --> 00:05:17,500
three-and-a-half to four billion years

140
00:05:21,300 --> 00:05:19,180
ago we don't know whether life could

141
00:05:23,460 --> 00:05:21,310
originate under today's conditions I

142
00:05:25,410 --> 00:05:23,470
think that that language was added not

143
00:05:27,240 --> 00:05:25,420
really to limit things but to point out

144
00:05:30,210 --> 00:05:27,250
that there's a lot of study going on

145
00:05:32,970 --> 00:05:30,220
trying to understand how life could

146
00:05:34,500 --> 00:05:32,980
originate under those conditions through

147
00:05:36,060 --> 00:05:34,510
and after four billion years ago but

148
00:05:40,290 --> 00:05:36,070
there's probably study that also needs

149
00:05:41,790 --> 00:05:40,300
to happen understanding the organic

150
00:05:44,670 --> 00:05:41,800
monomers that could be reduced under

151
00:05:47,580 --> 00:05:44,680
other conditions as well so we broke

152
00:05:49,860 --> 00:05:47,590
down this big question into 12 sub

153
00:05:51,480 --> 00:05:49,870
questions and we're just going to step

154
00:05:53,730 --> 00:05:51,490
through them and briefly introduce them

155
00:05:55,200 --> 00:05:53,740
and then at the end hopefully try and

156
00:05:57,630 --> 00:05:55,210
show you how this all ties in with the

157
00:05:59,220 --> 00:05:57,640
rest of the road map and see what

158
00:06:01,470 --> 00:05:59,230
conversation we might get from all of

159
00:06:04,950 --> 00:06:01,480
the participant I think doug is going to

160
00:06:10,080 --> 00:06:04,960
start their sub question one okay so

161
00:06:12,150 --> 00:06:10,090
some question one concerns the quality

162
00:06:15,090 --> 00:06:12,160
and quantity of organics and did a

163
00:06:16,440 --> 00:06:15,100

different plan g systems formed in

164
00:06:18,659 --> 00:06:16,450
different environments particularly

165
00:06:21,960 --> 00:06:18,669
comparing say giant molecular clouds

166
00:06:25,159 --> 00:06:21,970
with low mass isolated systems and that

167
00:06:27,540 --> 00:06:25,169
there are a couple of different possible

168
00:06:30,510 --> 00:06:27,550
influences here one is simply the fact

169
00:06:33,060 --> 00:06:30,520
that they eat the location in the galaxy

170
00:06:35,430 --> 00:06:33,070
and also for the tightening ages at the

171
00:06:37,620 --> 00:06:35,440
time of formation affects the total

172
00:06:39,780 --> 00:06:37,630
availability of metallicities because of

173
00:06:44,140 --> 00:06:39,790
the

174
00:06:45,909 --> 00:06:44,150
medium over time and also over space so

175
00:06:48,580 --> 00:06:45,919
that a gradient with respect to position

176
00:06:49,749 --> 00:06:48,590
in the galaxy but also even if we just

177
00:06:51,279 --> 00:06:49,759
consider the you know the solar

178
00:06:53,350 --> 00:06:51,289
neighborhood of the galaxy which is

179
00:06:55,210 --> 00:06:53,360
fairly homogeneous in terms of the

180
00:06:58,060 --> 00:06:55,220
chemical elements there's a huge

181
00:06:59,890 --> 00:06:58,070
difference between a massive star

182
00:07:01,719 --> 00:06:59,900
formation region and a low mass star

183
00:07:03,370 --> 00:07:01,729
formation region the example that

184
00:07:05,860 --> 00:07:03,380
astronomers typically give or the Orion

185
00:07:07,930 --> 00:07:05,870
molecular cloud for a massive region of

186
00:07:11,080 --> 00:07:07,940
the Taurus molecular cloud for a

187
00:07:15,310 --> 00:07:11,090
low-mass region and I kind of arises out

188
00:07:17,529 --> 00:07:15,320

of the fact that low mass stars like the

189
00:07:20,409 --> 00:07:17,539
Sun and like red dwarfs are much much

190
00:07:23,260 --> 00:07:20,419
more common than very high mass stars so

191
00:07:25,090 --> 00:07:23,270
if you if you only say have a hundred

192
00:07:26,800 --> 00:07:25,100
stars the chances of finding one really

193
00:07:29,260 --> 00:07:26,810
massive one in that group is pretty

194
00:07:30,850 --> 00:07:29,270
small whether give a thousand stars if

195
00:07:33,370 --> 00:07:30,860
the chances of finding a really massive

196
00:07:35,320 --> 00:07:33,380
star is fairly large and them as a

197
00:07:38,010 --> 00:07:35,330
massive star they can really influence

198
00:07:42,310 --> 00:07:38,020
the environment in which the stars form

199
00:07:45,760 --> 00:07:42,320
by producing a very strong ultraviolet

200
00:07:49,029 --> 00:07:45,770
radiation field once they you know

201
00:07:51,730 --> 00:07:49,039
emergen their photo stellar and below

202
00:07:54,730 --> 00:07:51,740
and also even by going supernova within

203
00:07:58,529 --> 00:07:54,740
the timescale of a of the time that it

204
00:08:01,480 --> 00:07:58,539
takes for us much more stars to be born

205
00:08:03,010 --> 00:08:01,490
so we'd really you know like you know

206
00:08:04,540 --> 00:08:03,020
one of the differences between those

207
00:08:07,210 --> 00:08:04,550
star formation regions and of course

208
00:08:09,310 --> 00:08:07,220
also what sort of region did the Sun for

209
00:08:11,409 --> 00:08:09,320
me well that there are statistical

210
00:08:13,300 --> 00:08:11,419
arguments to save the Sun formed in a

211
00:08:15,279 --> 00:08:13,310
massive star formation region and

212
00:08:18,370 --> 00:08:15,289
there's also some isotopic evidence that

213
00:08:20,920 --> 00:08:18,380

suggests that we don't know for sure and

214
00:08:22,779 --> 00:08:20,930
in any case we need to study both kinds

215
00:08:25,210 --> 00:08:22,789
because we're interested in the

216
00:08:26,920 --> 00:08:25,220
potential for inorganic materials making

217
00:08:29,050 --> 00:08:26,930
life and either of those environments

218
00:08:30,310 --> 00:08:29,060
and the photochemistry could be very

219
00:08:31,980 --> 00:08:30,320
important in a massive star formation

220
00:08:34,449 --> 00:08:31,990
region where you've got a lot of

221
00:08:39,880 --> 00:08:34,459
ultraviolet radiation from these massive

222
00:08:45,519 --> 00:08:39,890
stars ok so I can advance to sub

223
00:08:48,250 --> 00:08:45,529
question two so what are the relative

224
00:08:50,890 --> 00:08:48,260
importance is of molecules produced in

225
00:08:52,330 --> 00:08:50,900
the molecular cloud compared with them

226
00:08:55,020 --> 00:08:52,340
that are being modified in the

227
00:08:57,670 --> 00:08:55,030
protoplanetary disk this is kavitha a

228
00:08:59,200 --> 00:08:57,680
question of I guess nature versus

229
00:09:03,340 --> 00:08:59,210
nurture you know are the initial

230
00:09:05,650 --> 00:09:03,350
conditions there at the start of the

231
00:09:07,840 --> 00:09:05,660
collapse of a region to become an

232
00:09:10,840 --> 00:09:07,850
isolated young stellar object so that of

233
00:09:14,430 --> 00:09:10,850
a sort of the be all and end all or is

234
00:09:18,040 --> 00:09:14,440
there a lot of evolution along the way

235
00:09:19,690 --> 00:09:18,050
so we know in our own solar system for

236
00:09:21,940 --> 00:09:19,700
example at some of the material we find

237
00:09:24,790 --> 00:09:21,950
in each race is pre solar we can show

238
00:09:26,530 --> 00:09:24,800

that from isotopic studies but most of

239
00:09:29,440 --> 00:09:26,540
those materials are over first of all

240
00:09:31,480 --> 00:09:29,450
another abundant and secondly they're

241
00:09:33,630 --> 00:09:31,490
mostly refractory materials we'd really

242
00:09:36,130 --> 00:09:33,640
like to know more about the organics the

243
00:09:38,440 --> 00:09:36,140
organic refractory material the icy

244
00:09:41,110 --> 00:09:38,450
material is that some of that pre solo

245
00:09:42,820 --> 00:09:41,120
as well or not it's always been assumed

246
00:09:45,490 --> 00:09:42,830
the comments are a likely place to find

247
00:09:47,020 --> 00:09:45,500
some priests normal material but the

248
00:09:48,970 --> 00:09:47,030
amount of mixing that appears to have

249
00:09:51,490 --> 00:09:48,980
gone on in the solar nebula has thrown

250
00:09:53,440 --> 00:09:51,500
that in 20 and say a state of confusion

251
00:10:00,330 --> 00:09:53,450
but sell me a state of you know

252
00:10:04,090 --> 00:10:00,340
questioning original assumptions okay

253
00:10:06,160 --> 00:10:04,100
let's move on to number three then so if

254
00:10:09,190 --> 00:10:06,170
we follow this together i think as Jamie

255
00:10:11,020 --> 00:10:09,200
mentioned and my expertise and I think

256
00:10:14,590 --> 00:10:11,030
those are many of the other office here

257
00:10:16,420 --> 00:10:14,600
and more bias towards the first of the

258
00:10:18,430 --> 00:10:16,430
things in this list but we need to

259
00:10:20,590 --> 00:10:18,440
consider the more you know and each one

260
00:10:23,920 --> 00:10:20,600
kind of feeds into it to the next so you

261
00:10:26,470 --> 00:10:23,930
have in a stellar chemistry feeding into

262
00:10:28,330 --> 00:10:26,480
a protoplanetary disk feeding into

263
00:10:30,580 --> 00:10:28,340

material that forms on on a planet and

264
00:10:34,860 --> 00:10:30,590
being modified and planetary atmosphere

265
00:10:36,910 --> 00:10:34,870
ism water rich environments as well and

266
00:10:39,010 --> 00:10:36,920
each of these requires different

267
00:10:40,840 --> 00:10:39,020
mechanisms but they all may influence

268
00:10:43,660 --> 00:10:40,850
the outcome you know the outcome is what

269
00:10:45,460 --> 00:10:43,670
one of the raw material for life we need

270
00:10:46,840 --> 00:10:45,470
to understand each of these in trim and

271
00:10:49,780 --> 00:10:46,850
we also need to understand their

272
00:10:51,820 --> 00:10:49,790
relative importance if you change one

273
00:10:57,040 --> 00:10:51,830
does it have a drastic effect on the

274
00:10:59,500 --> 00:10:57,050
others and so on okay so I think that's

275
00:11:01,420 --> 00:10:59,510
all I wanted to say about number three

276
00:11:03,929 --> 00:11:01,430
so I'll turn it back to Jamie now I

277
00:11:06,329 --> 00:11:03,939
think the track is taking others

278
00:11:08,969 --> 00:11:06,339
this is greg springsteen from furman

279
00:11:10,949 --> 00:11:08,979
university i'm going to cover the next

280
00:11:13,079 --> 00:11:10,959
three sub questions or four through six

281
00:11:15,809 --> 00:11:13,089
and i think what would tie these sub

282
00:11:18,479 --> 00:11:15,819
questions together is the idea that we

283
00:11:19,679 --> 00:11:18,489
really are in many of these questions

284
00:11:21,869 --> 00:11:19,689
want to be looking at the epic

285
00:11:24,059 --> 00:11:21,879
thermodynamics so looking at both the

286
00:11:26,249 --> 00:11:24,069
degradation as well as the formation of

287
00:11:28,499 --> 00:11:26,259
many of these organics and what kind of

288
00:11:31,199 --> 00:11:28,509

concentrations that we might expect in a

289
00:11:34,319 --> 00:11:31,209
variety of environments so i'm not going

290
00:11:35,879 --> 00:11:34,329
to read through all the slides but i'll

291
00:11:38,369 --> 00:11:35,889
talk briefly through them so number four

292
00:11:40,469 --> 00:11:38,379
what is the survivability of organic

293
00:11:43,789 --> 00:11:40,479
monomers in their formation environment

294
00:11:45,989 --> 00:11:43,799
so we're certainly agnostic on what this

295
00:11:47,849 --> 00:11:45,999
environment in which the organic

296
00:11:51,029 --> 00:11:47,859
molecules were formed nor these these

297
00:11:53,429 --> 00:11:51,039
pre polymer monomers were formed but

298
00:11:55,649 --> 00:11:53,439
within a variety of environments that we

299
00:11:58,469 --> 00:11:55,659
all at the field can think of on what

300
00:12:01,199 --> 00:11:58,479
are the relative rates of formation what

301
00:12:05,999 --> 00:12:01,209
kinds of degradation pathways do we need

302
00:12:07,409 --> 00:12:06,009
to be thinking about as well sub

303
00:12:10,859 --> 00:12:07,419
question five is a little bit more

304
00:12:14,039 --> 00:12:10,869
specific on a degradation pathway if

305
00:12:16,949 --> 00:12:14,049
these organic monomers were formed off

306
00:12:19,349 --> 00:12:16,959
earth we need to think about the

307
00:12:21,319 --> 00:12:19,359
mechanisms of delivery to earth and also

308
00:12:23,429 --> 00:12:21,329
the mechanisms of degradation

309
00:12:26,009 --> 00:12:23,439
atmospheric to earth and also delivery

310
00:12:27,779 --> 00:12:26,019
to other bodies as well and so this is

311
00:12:30,089 --> 00:12:27,789
what is the survivability of organic

312
00:12:32,309 --> 00:12:30,099
monomers in their formation environment

313
00:12:34,710 --> 00:12:32,319

tonight I think God in this stream of

314
00:12:36,389 --> 00:12:34,720
consciousness where we originally this

315
00:12:38,969 --> 00:12:36,399
document was created we're using

316
00:12:40,439 --> 00:12:38,979
survivability really as this catch-all

317
00:12:42,359 --> 00:12:40,449
term for thermodynamics we're going to

318
00:12:46,679 --> 00:12:42,369
be thinking about both parts of the

319
00:12:50,759 --> 00:12:46,689
equation and then sub question six is a

320
00:12:53,219 --> 00:12:50,769
bit more specific down the wrong way no

321
00:12:54,899 --> 00:12:53,229
just unless me so question 6 what are

322
00:12:56,849 --> 00:12:54,909
the endogenous organic production

323
00:12:58,799 --> 00:12:56,859
processes active on the early Earth I

324
00:13:01,829 --> 00:12:58,809
think many of us are particularly

325
00:13:03,960 --> 00:13:01,839
interested in what are the possibilities

326
00:13:05,219 --> 00:13:03,970
of organic formation on the early Earth

327
00:13:06,550 --> 00:13:05,229
whether we're talking about the

328
00:13:09,310 --> 00:13:06,560
hydrothermal vents

329
00:13:11,230 --> 00:13:09,320
or the variety of of other environments

330
00:13:12,910 --> 00:13:11,240
we can think of on the earlier so this

331
00:13:15,970 --> 00:13:12,920
is going to require special I think

332
00:13:18,880 --> 00:13:15,980
consideration and so this sub question

333
00:13:22,330 --> 00:13:18,890
although maybe a sub sub question of

334
00:13:25,240 --> 00:13:22,340
four will have a special emphasis

335
00:13:26,829 --> 00:13:25,250
talking about the variety of kinetic and

336
00:13:33,610 --> 00:13:26,839
thermodynamic parameters on the

337
00:13:38,620 --> 00:13:33,620
formation in earlier okay so i'll pick

338
00:13:42,790 --> 00:13:38,630

it up for number seven so looking

339
00:13:46,180 --> 00:13:42,800
specifically at the end but external

340
00:13:48,820 --> 00:13:46,190
sources of organics we need to consider

341
00:13:51,760 --> 00:13:48,830
for example they do the organic sandy

342
00:13:54,610 --> 00:13:51,770
and the water come together or are they

343
00:13:56,620 --> 00:13:54,620
sort of separate questions and if if we

344
00:13:58,630 --> 00:13:56,630
think in terms of comets being a key

345
00:14:00,910 --> 00:13:58,640
source of material then obviously the

346
00:14:02,920 --> 00:14:00,920
ices and the organics are closely mixed

347
00:14:04,630 --> 00:14:02,930
in those and was coming together there's

348
00:14:05,620 --> 00:14:04,640
true to a lesser extent of asteroids as

349
00:14:07,300 --> 00:14:05,630
well of course because we come

350
00:14:09,840 --> 00:14:07,310
increasingly to realize that that

351
00:14:12,940 --> 00:14:09,850
asteroid the tight bodies can contain

352
00:14:17,170 --> 00:14:12,950
volatiles as well water of hydration and

353
00:14:19,570 --> 00:14:17,180
so on so evaluation of those two

354
00:14:21,250 --> 00:14:19,580
different classes of objects and their

355
00:14:22,900 --> 00:14:21,260
relative fluxes and of course is

356
00:14:25,780 --> 00:14:22,910
survivability as well because the

357
00:14:28,360 --> 00:14:25,790
dynamics of the asteroid population

358
00:14:32,320 --> 00:14:28,370
compared with a comet population is very

359
00:14:34,200 --> 00:14:32,330
different than the the impact speed for

360
00:14:37,210 --> 00:14:34,210
example is very different which makes

361
00:14:41,800 --> 00:14:37,220
flexing survivability so we'd like to

362
00:14:43,360 --> 00:14:41,810
know that the flux rate and the

363
00:14:51,400 --> 00:14:43,370

dynamical of factors that may affect

364
00:14:54,490 --> 00:14:51,410
survivability um okay turning to number

365
00:14:56,710 --> 00:14:54,500
eight what is the relative importance of

366
00:14:59,470 --> 00:14:56,720
exogenous and endogenous sources of

367
00:15:02,350 --> 00:14:59,480
organic compounds again that comes down

368
00:15:03,970 --> 00:15:02,360
to a number of factors which include

369
00:15:06,970 --> 00:15:03,980
some have already been mentioned such as

370
00:15:09,040 --> 00:15:06,980
survivability and if you have a flux of

371
00:15:11,530 --> 00:15:09,050
organic material you don't necessarily

372
00:15:14,530 --> 00:15:11,540
know whether it's going to survive the

373
00:15:15,520 --> 00:15:14,540
journey to the surface of the earth and

374
00:15:18,540 --> 00:15:15,530
of course these are very different

375
00:15:21,309 --> 00:15:18,550
difficult questions to answer

376
00:15:23,740 --> 00:15:21,319
we don't really know what the impact

377
00:15:25,480 --> 00:15:23,750
flux was at those early times we know

378
00:15:27,009 --> 00:15:25,490
about the late heavy bombardment we

379
00:15:30,069 --> 00:15:27,019
don't know what the flux rate was like

380
00:15:35,650 --> 00:15:30,079
before that there are ways to climb into

381
00:15:37,809 --> 00:15:35,660
that just surprised willing to continue

382
00:15:42,309 --> 00:15:37,819
we bring out there is all the other

383
00:15:44,170 --> 00:15:42,319
running particular materials or classes

384
00:15:48,400 --> 00:15:44,180
and materials that are unique to a

385
00:15:51,249 --> 00:15:48,410
particular mechanism and an example that

386
00:15:53,769 --> 00:15:51,259
springs to mind but may turn out to be

387
00:15:55,720 --> 00:15:53,779
important or not is the fact that we

388
00:15:59,249 --> 00:15:55,730

have these meteorites with amino acids

389
00:16:02,199 --> 00:15:59,259
and then that contain a chiral symmetry

390
00:16:06,639 --> 00:16:02,209
was that the key thing that caused

391
00:16:09,429 --> 00:16:06,649
Hammacher algae on europe that one

392
00:16:11,439 --> 00:16:09,439
avenue of exploration that might use I'm

393
00:16:14,519 --> 00:16:11,449
sure there are many other examples in my

394
00:16:17,410 --> 00:16:14,529
show will is a unique source of amateurs

395
00:16:21,759 --> 00:16:17,420
charge perhaps can't get here in any

396
00:16:24,069 --> 00:16:21,769
other way okay okay back future all

397
00:16:25,240 --> 00:16:24,079
right so sub question nine had to do

398
00:16:27,129 --> 00:16:25,250
with how a different energy sources

399
00:16:29,139 --> 00:16:27,139
result in different organic production

400
00:16:30,639 --> 00:16:29,149
so again we're looking at a whole

401
00:16:32,889 --> 00:16:30,649
variety of environments and different

402
00:16:34,869 --> 00:16:32,899
chemical reactions you might have the

403
00:16:36,850 --> 00:16:34,879
same precursor material in different

404
00:16:39,460 --> 00:16:36,860
regions that have different energy

405
00:16:41,110 --> 00:16:39,470
sources and different thermodynamic and

406
00:16:43,059 --> 00:16:41,120
kinetic drivers and again they might be

407
00:16:45,759 --> 00:16:43,069
producing unique four distinct

408
00:16:47,740 --> 00:16:45,769
distributions of compounds and we're

409
00:16:50,350 --> 00:16:47,750
trying to understand that again so we

410
00:16:52,749 --> 00:16:50,360
can tie it all into what the overall

411
00:16:54,129 --> 00:16:52,759
inventory was and what does was just

412
00:16:56,470 --> 00:16:54,139
saying about understanding if any

413
00:16:58,199 --> 00:16:56,480

particular source produced unique

414
00:17:03,040 --> 00:16:58,209
distributions unique compounds that were

415
00:17:05,140 --> 00:17:03,050
essential focuses on that energy sub

416
00:17:07,000 --> 00:17:05,150
question ten gets it also a Douglas

417
00:17:09,399 --> 00:17:07,010
saying about homo chirality where

418
00:17:11,260 --> 00:17:09,409
enantiomeric excesses at the monomer

419
00:17:13,870 --> 00:17:11,270
level important in establishing homo

420
00:17:15,939 --> 00:17:13,880
chirality in life so we know life today

421
00:17:18,039 --> 00:17:15,949
the Homolka reality is essential to life

422
00:17:20,319 --> 00:17:18,049
today but we all know at what stage in

423
00:17:22,390 --> 00:17:20,329
the origin of life that originated so we

424
00:17:24,340 --> 00:17:22,400
have these clues from some carbonaceous

425
00:17:26,860 --> 00:17:24,350
meteorites that have enantiomeric

426
00:17:28,449 --> 00:17:26,870
excesses of some compounds so but we

427
00:17:29,080 --> 00:17:28,459
don't understand how those were produced

428
00:17:31,120 --> 00:17:29,090
at the bottom

429
00:17:33,399 --> 00:17:31,130
level how that access was produced and

430
00:17:35,529 --> 00:17:33,409
then we don't know whether that access

431
00:17:37,840 --> 00:17:35,539
at the monomer level exerted an

432
00:17:40,149 --> 00:17:37,850
influence on the emergence of biological

433
00:17:42,159 --> 00:17:40,159
homo chirality or maybe not maybe home

434
00:17:44,289 --> 00:17:42,169
okay reality emerged later on in the

435
00:17:48,399 --> 00:17:44,299
origination of life but trying to

436
00:17:50,289 --> 00:17:48,409
understand whether the monomers excesses

437
00:17:53,980 --> 00:17:50,299
had any role in homo chirality is an

438
00:17:55,570 --> 00:17:53,990

interesting question so question 11 is a

439
00:17:57,909 --> 00:17:55,580
little bit similar it's trying to

440
00:17:59,980 --> 00:17:57,919
understand the connection between the

441
00:18:02,529 --> 00:17:59,990
organic monomers produced and those used

442
00:18:04,450 --> 00:18:02,539
in terrestrial biology because chemistry

443
00:18:06,820 --> 00:18:04,460
may bad at chemistry produces a wide

444
00:18:09,130 --> 00:18:06,830
range of compounds only some of which

445
00:18:12,100 --> 00:18:09,140
are used by life and trying to

446
00:18:14,590 --> 00:18:12,110
understand why life selected those

447
00:18:16,570 --> 00:18:14,600
particular subgroup of compounds is

448
00:18:20,080 --> 00:18:16,580
there what was the driving force behind

449
00:18:23,799 --> 00:18:20,090
that does it have to do with use a

450
00:18:26,620 --> 00:18:23,809
productive and there are drivers will

451
00:18:28,659 --> 00:18:26,630
help understand the relative importance

452
00:18:31,600 --> 00:18:28,669
of all of these compounds for the origin

453
00:18:33,340 --> 00:18:31,610
of life and the last sub question we had

454
00:18:35,860 --> 00:18:33,350
was what changes take place to these

455
00:18:37,630 --> 00:18:35,870
organics over time in the terrestrial

456
00:18:39,250 --> 00:18:37,640
environment and this ties back a bit to

457
00:18:42,610 --> 00:18:39,260
the earlier questions that Greg had

458
00:18:43,960 --> 00:18:42,620
about survivability but basically you

459
00:18:46,810 --> 00:18:43,970
know once you have all of these

460
00:18:48,039 --> 00:18:46,820
different sources of organics on the on

461
00:18:50,260 --> 00:18:48,049
the surface of the early Earth on

462
00:18:52,450 --> 00:18:50,270
another planetary surface what further

463
00:18:55,870 --> 00:18:52,460

chemistry happens further synthesis or

464
00:18:58,779 --> 00:18:55,880
reaction functionalization and how do

465
00:19:02,049 --> 00:18:58,789
these interplay together to lead to a

466
00:19:04,480 --> 00:19:02,059
more more a richer organic inventory and

467
00:19:06,399 --> 00:19:04,490
eventually to the origin of life those

468
00:19:08,320 --> 00:19:06,409
are the 12 sub questions that we came up

469
00:19:10,389 --> 00:19:08,330
with when we were doing that when we're

470
00:19:12,220 --> 00:19:10,399
creating this document originally it's

471
00:19:13,690 --> 00:19:12,230
quite possible that we're missing some

472
00:19:16,389 --> 00:19:13,700
or that some are redundant or

473
00:19:18,130 --> 00:19:16,399
unnecessary or unclear and so we'd

474
00:19:20,799 --> 00:19:18,140
really like to make sure that the

475
00:19:22,419 --> 00:19:20,809
community participates in letting us

476
00:19:24,430 --> 00:19:22,429
know that so that in the next round of

477
00:19:26,710 --> 00:19:24,440
edits we can get a more coherent

478
00:19:29,230 --> 00:19:26,720
document the last thing i want to show

479
00:19:32,230 --> 00:19:29,240
before we open this up for discussion is

480
00:19:34,120 --> 00:19:32,240
just the overall road map network as it

481
00:19:36,279 --> 00:19:34,130
is right now zoom in in a second so now

482
00:19:38,440 --> 00:19:36,289
this is hard to read I saw in that poll

483
00:19:40,760 --> 00:19:38,450
that many of you tuned in to the webinar

484
00:19:42,650 --> 00:19:40,770
last week where Michael new prison

485
00:19:44,720 --> 00:19:42,660
this is sort of how all the different

486
00:19:49,160 --> 00:19:44,730
road map documents are connected right

487
00:19:51,590 --> 00:19:49,170
now and if we on the left you can see

488
00:19:54,500 --> 00:19:51,600

there's sort of a group of documents

489
00:19:56,150 --> 00:19:54,510
that are prebiotic to biotic chemistry

490
00:19:58,010 --> 00:19:56,160
and if we zoom in there is still a

491
00:19:59,960 --> 00:19:58,020
little hard to see we're looking at

492
00:20:02,210 --> 00:19:59,970
document three right now what are the

493
00:20:04,760 --> 00:20:02,220
sources of organic monomers relevant to

494
00:20:06,260 --> 00:20:04,770
the origin of life and it ties in a

495
00:20:07,820 --> 00:20:06,270
little bit to document to which i think

496
00:20:10,340 --> 00:20:07,830
is going to have a webinar next week

497
00:20:11,630 --> 00:20:10,350
about primitive icy bodies and chemistry

498
00:20:13,850 --> 00:20:11,640
there but what we were really

499
00:20:15,890 --> 00:20:13,860
envisioning when we came up with this

500
00:20:18,530 --> 00:20:15,900
document with that the organic monomers

501
00:20:20,500 --> 00:20:18,540
that were discussing here then feed into

502
00:20:23,120 --> 00:20:20,510
more steps of polymerization

503
00:20:25,460 --> 00:20:23,130
functionalization and eventually that

504
00:20:28,310 --> 00:20:25,470
green box at the bottom is what is the

505
00:20:30,950 --> 00:20:28,320
earliest life look like so that's how we

506
00:20:32,750 --> 00:20:30,960
see how this question ties into some of

507
00:20:35,620 --> 00:20:32,760
the bigger astrobiology questions and

508
00:20:38,240 --> 00:20:35,630
then that arrow that's going off-screen

509
00:20:40,340 --> 00:20:38,250
connect to another box another document

510
00:20:42,680 --> 00:20:40,350
about bio signatures because obviously

511
00:20:44,270 --> 00:20:42,690
understanding that a biotic chemical

512
00:20:45,890 --> 00:20:44,280
distributions that can be formed is

513
00:20:47,930 --> 00:20:45,900

important so that we're able to

514
00:20:50,780 --> 00:20:47,940
recognize bio signatures and distinguish

515
00:20:53,630 --> 00:20:50,790
them from chemicals from a biotic

516
00:20:56,300 --> 00:20:53,640
chemical so that's where this document

517
00:20:58,220 --> 00:20:56,310
fits into the bigger network and I think

518
00:20:59,900 --> 00:20:58,230
if you've now had an overview of

519
00:21:02,270 --> 00:20:59,910
everything that's in that Google

520
00:21:03,710 --> 00:21:02,280
document and hopefully there are some

521
00:21:09,950 --> 00:21:03,720
questions or comments from the

522
00:21:12,950 --> 00:21:09,960
participants now great thanks thanks

523
00:21:14,930 --> 00:21:12,960
Jamie thanks Greg thanks Doug yeah so

524
00:21:18,290 --> 00:21:14,940
basically we want to just encourage you

525
00:21:20,270 --> 00:21:18,300
now to having heard the structure and

526
00:21:21,260 --> 00:21:20,280
what's in the document known like me

527
00:21:23,390 --> 00:21:21,270
better chance have a look at the

528
00:21:26,570 --> 00:21:23,400
document itself to see if anybody has

529
00:21:28,910 --> 00:21:26,580
any immediate comments or questions or

530
00:21:31,130 --> 00:21:28,920
things they'd like to raise with the

531
00:21:32,900 --> 00:21:31,140
group and get some feedback from Greg

532
00:21:37,720 --> 00:21:32,910
and Jamie and Doug while we're all

533
00:21:40,400 --> 00:21:37,730
online so I John I think you wanted to

534
00:21:42,350 --> 00:21:40,410
contribute something I so you put your

535
00:21:45,440 --> 00:21:42,360
hand up there well I hope it's a

536
00:21:48,320 --> 00:21:45,450
contribution i do have kind of a

537
00:21:50,740 --> 00:21:48,330
shortage of time today but as i listened

538
00:21:54,530 --> 00:21:50,750

to the sub questions come through it

539
00:21:57,080 --> 00:21:54,540
seemed to me that the basic mode

540
00:21:59,480 --> 00:21:57,090
that was being addressed with one where

541
00:22:01,850 --> 00:21:59,490
the entire Earth is a warm little pond

542
00:22:03,920 --> 00:22:01,860
of sorts and we're going to fill it up

543
00:22:07,820 --> 00:22:03,930
full of organic monomers and then see if

544
00:22:12,740 --> 00:22:07,830
something cool happens and what I didn't

545
00:22:14,510 --> 00:22:12,750
hear was the specific addressing of an

546
00:22:16,970 --> 00:22:14,520
interaction between a dynamic

547
00:22:20,500 --> 00:22:16,980
environment on the earth and the

548
00:22:24,430 --> 00:22:20,510
development of organic monomers in the

549
00:22:27,530 --> 00:22:24,440
context of a potentially

550
00:22:29,750 --> 00:22:27,540
self-replicating profits and so rather

551
00:22:31,130 --> 00:22:29,760
than thinking of organic monomers that

552
00:22:34,550 --> 00:22:31,140
are something that are floating around

553
00:22:38,000 --> 00:22:34,560
and are lucky enough to run into either

554
00:22:41,330 --> 00:22:38,010
you know the right clays or some kind of

555
00:22:43,370 --> 00:22:41,340
mineral surfaces or maybe a

556
00:22:47,120 --> 00:22:43,380
low-temperature hydrothermal vent

557
00:22:50,480 --> 00:22:47,130
environment I'll Jack Corliss I'm

558
00:22:55,010 --> 00:22:50,490
thinking of you know how much feedback

559
00:22:56,990 --> 00:22:55,020
does the earth system have on the

560
00:23:00,500 --> 00:22:57,000
development of these monitors in the

561
00:23:03,910 --> 00:23:00,510
context of the origin of life itself as

562
00:23:07,430 --> 00:23:03,920
opposed to the concept of an organic

563
00:23:10,130 --> 00:23:07,440

soup of one kind or another so that was

564
00:23:13,610 --> 00:23:10,140
just my take home messages that there

565
00:23:16,610 --> 00:23:13,620
might be more interaction and some kind

566
00:23:18,950 --> 00:23:16,620
of a feedback process that doesn't seem

567
00:23:24,020 --> 00:23:18,960
to be addressed in the questions the way

568
00:23:26,210 --> 00:23:24,030
I read them now thank you that'll be a

569
00:23:28,790 --> 00:23:26,220
good thing to add in the next round of

570
00:23:30,650 --> 00:23:28,800
edit that last sub question 12 about

571
00:23:32,570 --> 00:23:30,660
what happens to these monomers once

572
00:23:34,640 --> 00:23:32,580
they're in the environment I think could

573
00:23:37,010 --> 00:23:34,650
be expanded and reworked to address what

574
00:23:38,680 --> 00:23:37,020
you just what you just brought out the

575
00:23:41,240 --> 00:23:38,690
interaction between the environment and

576
00:23:42,830 --> 00:23:41,250
chemistry well it may be that the

577
00:23:47,750 --> 00:23:42,840
environment doesn't produce the right

578
00:23:50,390 --> 00:23:47,760
organic monomers off bat and that you in

579
00:23:52,340 --> 00:23:50,400
fact have to have this interaction to

580
00:23:54,980 --> 00:23:52,350
get the monomers of interests produced

581
00:23:57,470 --> 00:23:54,990
in the first place that's kind of the

582
00:24:02,740 --> 00:23:57,480
way of looking at it part of our

583
00:24:05,600 --> 00:24:02,750
discussion of not talking about what

584
00:24:06,350 --> 00:24:05,610
specific sort of microenvironments might

585
00:24:09,050 --> 00:24:06,360
be of interest

586
00:24:10,700 --> 00:24:09,060
was not to who is intent not to limit

587
00:24:14,150 --> 00:24:10,710
what the proposals of those

588
00:24:16,160 --> 00:24:14,160

microenvironments might be and it wasn't

589
00:24:19,760 --> 00:24:16,170
a sense of well let's just treat the

590
00:24:21,440 --> 00:24:19,770
earth environment the global one um but

591
00:24:27,890 --> 00:24:21,450
but yeah just rather idea let's not

592
00:24:33,680 --> 00:24:27,900
limit the ideas out there we looked at

593
00:24:36,410 --> 00:24:33,690
it hey okay great and so just to make

594
00:24:37,880 --> 00:24:36,420
sure if anybody else has any comments

595
00:24:41,050 --> 00:24:37,890
they want to make or questions they want

596
00:24:45,350 --> 00:24:41,060
to ask or anything to be clarified I

597
00:24:47,060 --> 00:24:45,360
think that the line is is open if there

598
00:24:48,320 --> 00:24:47,070
are more than one person if you at the

599
00:24:50,270 --> 00:24:48,330
top of the screen there there's a raised

600
00:24:53,900 --> 00:24:50,280
hand button and we can work through

601
00:24:55,820 --> 00:24:53,910
people if there are any comments so yeah

602
00:24:58,520 --> 00:24:55,830
Pauline do you want to go ahead thanks

603
00:25:01,340 --> 00:24:58,530
well good afternoon everyone I think

604
00:25:03,440 --> 00:25:01,350
another question that is really going to

605
00:25:07,730 --> 00:25:03,450
be very difficult to answer is the very

606
00:25:10,850 --> 00:25:07,740
vast heterogeneity on just our planet in

607
00:25:12,800 --> 00:25:10,860
terms of varying temperatures and

608
00:25:15,770 --> 00:25:12,810
varying concentrations of water and

609
00:25:18,860 --> 00:25:15,780
cycling of temperature and cycling of

610
00:25:20,750 --> 00:25:18,870
conditions so that in any one place the

611
00:25:22,820 --> 00:25:20,760
answer may be very different from what

612
00:25:27,910 --> 00:25:22,830
the answer might be in some other place

613
00:25:30,530 --> 00:25:27,920

maybe only even meters away um and now

614
00:25:32,150 --> 00:25:30,540
given again the avast amount of time

615
00:25:34,670 --> 00:25:32,160
that we might be talking about in those

616
00:25:36,680 --> 00:25:34,680
kinds of changes some of these may be

617
00:25:39,650 --> 00:25:36,690
very difficult questions to ask because

618
00:25:42,770 --> 00:25:39,660
all we have to do is find something that

619
00:25:44,510 --> 00:25:42,780
happened once it may have happened many

620
00:25:47,900 --> 00:25:44,520
many times but it had to only be

621
00:25:51,140 --> 00:25:47,910
successful one and that's I think going

622
00:25:52,570 --> 00:25:51,150
to add another layer to the difficulty

623
00:25:55,150 --> 00:25:52,580
in answering some of these questions

624
00:25:58,590 --> 00:25:55,160
thank you

625
00:26:03,779 --> 00:26:00,990
Jamie Greg done with you did you want to

626
00:26:05,190 --> 00:26:03,789
respond on that or is that too bad into

627
00:26:07,830 --> 00:26:05,200
the comments and the documents again

628
00:26:10,080 --> 00:26:07,840
yeah I mean information overload is a

629
00:26:12,630 --> 00:26:10,090
serious problem you know I really get

630
00:26:14,490 --> 00:26:12,640
the comment right we we can get as many

631
00:26:16,740 --> 00:26:14,500
results as we have time for experiment

632
00:26:21,990 --> 00:26:16,750
and our analytical techniques are good

633
00:26:25,590 --> 00:26:22,000
not to pick up got million issue thanks

634
00:26:28,620 --> 00:26:25,600
great okay any other any other questions

635
00:26:35,039 --> 00:26:28,630
any other comments anybody wants to to

636
00:26:38,580 --> 00:26:35,049
chip in as I said before this document

637
00:26:40,740 --> 00:26:38,590
will be opened up for commenting as soon

638
00:26:43,590 --> 00:26:40,750

as the this webinar finishes so you'll

639
00:26:45,779 --> 00:26:43,600
have chance to go and review and and put

640
00:26:47,549 --> 00:26:45,789
your comments if you prefer to kind of

641
00:26:49,049 --> 00:26:47,559
think and type and check them into the

642
00:26:51,990 --> 00:26:49,059
document there will be plenty of

643
00:26:53,490 --> 00:26:52,000
opportunity to do that but if there any

644
00:27:01,250 --> 00:26:53,500
other any of the comments questions now

645
00:27:05,720 --> 00:27:04,340
I suspect if there's nobody else wants

646
00:27:07,250 --> 00:27:05,730
to ask anything in this in this

647
00:27:09,770 --> 00:27:07,260
particular open forum I suspect we're

648
00:27:10,910 --> 00:27:09,780
probably at the end I don't know Greg

649
00:27:12,920 --> 00:27:10,920
Jamie Doug whether you had any

650
00:27:15,200 --> 00:27:12,930
concluding remarks or comments you want

651
00:27:19,460 --> 00:27:15,210
to make or we all are we all good to go

652
00:27:21,080 --> 00:27:19,470
I think we're good I just hope that

653
00:27:22,640 --> 00:27:21,090
people will make comments on the google

654
00:27:24,290 --> 00:27:22,650
doc so that we can incorporate

655
00:27:26,840 --> 00:27:24,300
everyone's few points into the final

656
00:27:28,100 --> 00:27:26,850
document exactly I mean it just to

657
00:27:29,900 --> 00:27:28,110
reiterate what Jamie said at the

658
00:27:32,090 --> 00:27:29,910
beginning there were really hoping for a

659
00:27:34,130 --> 00:27:32,100
big community effort to to make these

660
00:27:36,320 --> 00:27:34,140
documents as good as they possibly can

661
00:27:38,630 --> 00:27:36,330
be we have quite a bit of time I think

662
00:27:40,940 --> 00:27:38,640
between now and next April before the

663
00:27:42,440 --> 00:27:40,950

process kind of rolls forward so so

664
00:27:44,630 --> 00:27:42,450
please do get stuck in and read through

665
00:27:46,610 --> 00:27:44,640
and uncomment and I know the authors

666
00:27:48,710 --> 00:27:46,620
will will value that and they'll respond

667
00:27:50,300 --> 00:27:48,720
to the comments as well so we can get a

668
00:27:51,740 --> 00:27:50,310
bit of a discussion going sorry great i

669
00:27:54,410 --> 00:27:51,750
think i know i'm just going to reiterate

670
00:27:56,270 --> 00:27:54,420
what our Jimmy had said before that it

671
00:27:57,830 --> 00:27:56,280
was a stream of consciousness from a

672
00:28:00,830 --> 00:27:57,840
limited group of people with certainly

673
00:28:02,840 --> 00:28:00,840
not expertise everywhere so we really

674
00:28:05,260 --> 00:28:02,850
need people from a variety of expertise

675
00:28:07,580 --> 00:28:05,270
is looking at document commenting on it

676
00:28:09,380 --> 00:28:07,590
Brendan thank you this is Ronald Breslow

677
00:28:11,300 --> 00:28:09,390
at the Columbia I just joined this I'm

678
00:28:14,060 --> 00:28:11,310
sorry I got caught up in something else

679
00:28:18,710 --> 00:28:14,070
and I suddenly realized I was late but

680
00:28:22,160 --> 00:28:18,720
I'm without program now part of it as a

681
00:28:24,730 --> 00:28:22,170
filler mass in connection with sub

682
00:28:28,030 --> 00:28:24,740
question once Doug was talking about

683
00:28:31,220 --> 00:28:28,040
perhaps it would be useful to comment on

684
00:28:34,910 --> 00:28:31,230
raise the question of what happens at

685
00:28:38,000 --> 00:28:34,920
high redshift are when in galaxies where

686
00:28:40,010 --> 00:28:38,010
the chemical abundances are the

687
00:28:42,710 --> 00:28:40,020
elemental abundances may be different

688
00:28:45,740 --> 00:28:42,720

local environment want to think about

689
00:28:49,340 --> 00:28:45,750
the universe as a whole and possible

690
00:28:51,920 --> 00:28:49,350
early Oh possible life in quite

691
00:28:54,350 --> 00:28:51,930
different environments well that's yeah

692
00:28:55,670 --> 00:28:54,360
that's a good point um I think if we

693
00:28:57,470 --> 00:28:55,680
could understand our own local

694
00:28:59,150 --> 00:28:57,480
environment better it with give is more

695
00:29:01,850 --> 00:28:59,160
of a perspective to understand another

696
00:29:03,470 --> 00:29:01,860
one but of course as you know abundance

697
00:29:05,060 --> 00:29:03,480
variations occur within our own galaxy

698
00:29:11,320 --> 00:29:05,070
before you even think about other

699
00:29:19,190 --> 00:29:16,820
okay thanks Bill any other comments any

700
00:29:21,830 --> 00:29:19,200
of the questions people want to open up

701
00:29:24,230 --> 00:29:21,840
right now if not hopefully we'll see you

702
00:29:26,360 --> 00:29:24,240
online either on the website in

703
00:29:28,040 --> 00:29:26,370
discussion forum or in the document in

704
00:29:32,180 --> 00:29:28,050
the comments section and we look forward

705
00:29:37,310 --> 00:29:32,190
to hearing from you again for enjoying I

706
00:29:39,740 --> 00:29:37,320
know hey everybody this is sorry this is

707
00:29:41,420 --> 00:29:39,750
Lindsay Hayes I just wanted to make a

708
00:29:44,270 --> 00:29:41,430
comment just so we could be clear about

709
00:29:47,030 --> 00:29:44,280
the scheduling i'm not sure if something

710
00:29:49,670 --> 00:29:47,040
got lost we're looking to finish the

711
00:29:51,950 --> 00:29:49,680
webinars at the end of this calendar

712
00:29:53,750 --> 00:29:51,960
year or maybe a little bit into next

713
00:29:56,570 --> 00:29:53,760

year and we're looking to produce the

714
00:29:58,100 --> 00:29:56,580
final document by by april so we

715
00:30:00,770 --> 00:29:58,110
definitely have a you know a good amount

716
00:30:03,560 --> 00:30:00,780
of time to be working on these but not

717
00:30:06,560 --> 00:30:03,570
quite all the way until april okay sorry

718
00:30:08,510 --> 00:30:06,570
thanks Lindsay yep that's great sorry

719
00:30:10,250 --> 00:30:08,520
that was a we making a comment before

720
00:30:13,760 --> 00:30:10,260
they're gonna make it me a college along

721
00:30:15,470 --> 00:30:13,770
the same lines I think it's good to get

722
00:30:18,020 --> 00:30:15,480
things done quickly right I think I

723
00:30:20,150 --> 00:30:18,030
think if people on this webinar have

724
00:30:23,140 --> 00:30:20,160
comments I would recommend they going

725
00:30:25,130 --> 00:30:23,150
right them now rather than you know wait

726
00:30:31,160 --> 00:30:25,140
sometime down the line when they produce

727
00:30:33,650 --> 00:30:31,170
about yes absolutely okay thanks Doug

728
00:30:35,150 --> 00:30:33,660
thanks Jamie thanks Greg I hope that was

729
00:30:36,830 --> 00:30:35,160
useful and interesting to everyone

730
00:30:39,290 --> 00:30:36,840
listening in and we look forward to

731
00:30:42,680 --> 00:30:39,300
hearing from you online so go there now

732
00:30:44,000 --> 00:30:42,690
and start commenting I'll make sure that

733
00:30:45,530 --> 00:30:44,010
document gets opened up straight away so

734
00:30:52,880 --> 00:30:45,540
as in the next couple of minutes you

735
00:30:55,049 --> 00:30:52,890
should be able to to get in there okay