



**Downscaled transient temperature and precipitation data
since the last glacial maximum**

CHELSA-TraCE21k v1.0: Technical specification

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Version 1.0

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Revision history

Version	Date	Changes
1.0	17.02.2021	Initial document
1.1	07.06.2023	Added description about temperature lapse rates

Introduction

High resolution, downscaled climate model data are used in a wide variety of applications in environmental sciences. Here we present the CHELSA-TraCE21k downscaling algorithm to create global monthly climatologies for temperature and precipitation at 30 arcsec spatial resolution in 100 year time steps for the last 21,000 years. Paleo orography at high spatial resolution and at each timestep is created by combining high resolution information on glacial cover from current and Last Glacial Maximum (LGM) glacier databases with the interpolation of a dynamic ice sheet model (ICE6G) and a coupling to mean annual temperatures from CCSM3-TraCE21k. Based on the reconstructed paleo orography, mean annual temperature and precipitation was downscaled using the CHELSA V1.2 algorithm.

Grid Structure

All global CHELSA-TraCE21k products are in a geographic coordinate system referenced to the WGS 84 horizontal datum, with the horizontal coordinates expressed in decimal degrees. The CHELSA layer extents (minimum and maximum latitude and longitude) are a result of the coordinate system inherited from the 1-arc-second GMTED2010 data which itself inherited the grid extent from the 1-arc-second SRTM data.

Table 1. Grid extent of the GeoTiff files

description	value
Resolution	0.0083333333
West extent (minimum X-coordinate, longitude):	-179.9959722222
South extent (minimum Y-coordinate, latitude)	-89.9959722222
East extent (maximum X-coordinate, longitude)	179.9956930045
North extent (maximum Y-coordinate, latitude)	83.9956937485
Rows	20880
Columns	43200

Note that because of the pixel center referencing of the input GMTED2010 data the full extent of each CHELSA grid as defined by the outside edges of the pixels differs from an integer value of latitude or longitude by 0.000138888888 degree (or 1/2 arc-second). Users of products based on the legacy GTOPO30 product should note that the coordinate referencing of CHELSA (and GMTED2010) and GTOPO30 are not the same. In GTOPO30, the integer lines of latitude and longitude fall directly on the edges of a 30-arc-second pixel. Thus, when overlaying CHELSA with products based on GTOPO30 a slight shift of 1/2 arc-second will be observed between the edges of corresponding 30-arc-second pixels.

Grid cells around the dateline can be filled with 0 in case of pr. These values are due to a problem with the interpolation algorithm as the algorithm could not wrap around the dateline. These values can be disregarded.

Table 2. Grid extent of the GeoTiff files for the temperature lapse rate (tz)

description	value
Resolution	3.7088976407
West extent (minimum X-coordinate, longitude):	0.097913248
South extent (minimum Y-coordinate, latitude)	-87.1590945557
East extent (maximum X-coordinate, longitude)	356.1520867552
North extent (maximum Y-coordinate, latitude)	87.1590945572
Rows	48
Columns	97

Format and File Organization

CHELSA-TraCE21k data files are provided in GeoTiff format. Due to the size of the CHELSA-TraCE21k archive, most files were compressed using `gdal_translate` with the parameters `COMPRESS=DEFLATE` and `PREDICTOR=2`, which does not require an additional unpacking procedure before the data can be used. The data can be read by all common GeoTiff – compliant programs. In R for example, GeoTiff files can be read using the ‘raster’ package (e.g. `gl <- raster(path_2_GeoTiff_file)`). The metadata can be read using e.g. `gdal` (e.g. `gdalinfo path_2_GeoTiff_file`).

Dimensions

All files contain variables that define the dimensions of longitude, latitude.

Table 3. Dimension Variables Contained in the GeoTiff Files

Name	Description	type	Attribute
lon	Longitude	double	degrees_east
lat	Latitude	double	degrees_north

File Naming Conventions

The filename of each CHELSA-TraCE21k data product follows a similar structure including the respective model used, the variable short name, the respective time variables, and the accumulation (or mean) period in the following basic format:

CHELSA-[*model*]-[*variable*]-[[*month*]]-[*timeID*]-[*version*].tif

month is only available for *pr*, *tasmax*, *tasmin*, but not for annual values such as *dem*, *swe*, *scd*, *glz*, or *bio*.

Variables

All files contain one variable of CHELSA-TraCE21k below. Files are 2 dimensional. Time-averaged files usually indicate the mid point date for the aggregation period (e.g. April 15 for monthly aggregated data). All data follows a proleptic-gregorian calendar. A glossary with a brief description of each variable is available in the separate GEOS-5 Variable Definition Glossary, available on the GMAO web page.

Table 3. List of Variables

varname	shortname	Longname	Units	Description
tasmax	tasmax	Daily Minimum Near-Surface Air Temperature	K/10	maximum near-surface (2 meter) air temperature
tasmin	tasmin	Daily Maximum Near-Surface Air Temperature	K/10	minimum near-surface (2 meter) air temperature
pr	pr	Precipitation	kg m ⁻² month ⁻¹	precipitation flux (includes both liquid and solid phases)
scd	scd	Snow cover days	Count	Average number of days with snow cover per year
swe	swe	Snow water equivalent	kg m ⁻² year ⁻¹	Number of dry periods of more than 5 days
bio1	Annual Mean Temperature	Annual Mean Temperature	C	Mean of monthly (tasmax+tasmin)/2
bio2	Mean Diurnal Range	Mean Diurnal Range	C	tasmax – tasmin. The annual mean of all the monthly diurnal temperature ranges. Each monthly diurnal range is the difference between that month's maximum and minimum temperature
bio3	Isothermality	Isothermality	unitless	The mean diurnal range (bio2) divided by the

				annual temperature range (bio7).
bio4	Temperature Seasonality	Temperature Seasonality	C	The standard deviation of the monthly mean temperatures.
bio5	Max Temperature of Warmest Month	Max Temperature of Warmest Month	C	The highest temperature of any monthly maximum temperature.
bio6	Min Temperature of Coldest Month	Min Temperature of Coldest Month	C	The lowest temperature of any monthly minimum temperature.
bio7	Temperature Annual Range	Temperature Annual Range	C	The difference between the Maximum Temperature of Warmest Period and the Minimum Temperature of Coldest Period.
bio8	Mean Temperature of Wettest Quarter	Mean Temperature of Wettest Quarter	C	The wettest quarter of the year is determined (to the nearest month), and the mean temperature of this period is calculated.
bio9	Mean Temperature of Driest Quarter	Mean Temperature of Driest Quarter	C	The driest quarter of the year is determined (to the nearest month), and the mean temperature of this period is calculated.
bio10	Mean Temperature of Warmest Quarter	Mean Temperature of Warmest Quarter	C	The warmest quarter of the year is determined (to the nearest month), and the mean temperature of this period is calculated.
bio11	Mean Temperature of Coldest Quarter	Mean Temperature of Coldest Quarter	C	The coldest quarter of the year is determined (to the

				nearest month), and the mean temperature of this period is calculated.
bio12	Annual Precipitation	Annual Precipitation	kg m ⁻² year ⁻¹	The sum of all the monthly precipitation estimates.
bio13	Precipitation of Wettest Month	Precipitation of Wettest Month	kg m ⁻² month ⁻¹	The precipitation of the wettest month.
bio14	Precipitation of Driest Month	Precipitation of Driest Month	kg m ⁻² month ⁻¹	The precipitation of the driest month.
bio15	Precipitation Seasonality	Precipitation Seasonality	Unitless	The Coefficient of Variation is the standard deviation of the monthly precipitation estimates expressed as a percentage of the mean of those estimates (i.e. the annual mean).
bio16	Precipitation of Wettest Quarter	Precipitation of Wettest Quarter	kg m ⁻² quarter ⁻¹	The wettest quarter of the year is determined (to the nearest month), and the total precipitation over this period is calculated.
bio17	Precipitation of Driest Quarter	Precipitation of Driest Quarter	kg m ⁻² quarter ⁻¹	The driest quarter of the year is determined (to the nearest month), and the total precipitation over this period is calculated.
bio18	Precipitation of Warmest Quarter	Precipitation of Warmest Quarter	kg m ⁻² quarter ⁻¹	The warmest quarter of the year is determined (to the nearest month), and the total precipitation over this period is calculated.

bio19	Precipitation of Coldest Quarter	Precipitation of Coldest Quarter	kg m-2 quarter-1	The coldest quarter of the year is determined (to the nearest month), and the total precipitation over this period is calculated.
dem	elevation	elevation	m	Surface elevation above sea level.
glz	glacier elevation	glacier elevation	m	Surface elevation of the glaciers above sea level.
tz	air-temperature lapse rate	air-temperature lapse rate	K/m	The atmospheric temperature lapse rate as Kelvin per meter. Negative values indicate a decrease in K with altitude.

Table 4. timeID and the respective start and end year used for the aggregations. All data follows a proleptic-gregorian calendar.

timeID	startyear	endyear	k BP
20	1900	1990	0
19	1800	1899	0.1
18	1700	1799	0.2
17	1600	1699	0.3
16	1500	1599	0.4
15	1400	1499	0.5
14	1300	1399	0.6
13	1200	1299	0.7
12	1100	1199	0.8
11	1000	1099	0.9
10	900	999	1
9	800	899	1.1
8	700	799	1.2
7	600	699	1.3
6	500	599	1.4
5	400	499	1.5
4	300	399	1.6
3	200	299	1.7
2	100	199	1.8
1	0	99	1.9
0	-100	-1	2

-1	-200	-101	2.1
-2	-300	-201	2.2
-3	-400	-301	2.3
-4	-500	-401	2.4
-5	-600	-501	2.5
-6	-700	-601	2.6
-7	-800	-701	2.7
-8	-900	-801	2.8
-9	-1000	-901	2.9
-10	-1100	-1001	3
-11	-1200	-1101	3.1
-12	-1300	-1201	3.2
-13	-1400	-1301	3.3
-14	-1500	-1401	3.4
-15	-1600	-1501	3.5
-16	-1700	-1601	3.6
-17	-1800	-1701	3.7
-18	-1900	-1801	3.8
-19	-2000	-1901	3.9
-20	-2100	-2001	4
-21	-2200	-2101	4.1
-22	-2300	-2201	4.2
-23	-2400	-2301	4.3
-24	-2500	-2401	4.4
-25	-2600	-2501	4.5
-26	-2700	-2601	4.6
-27	-2800	-2701	4.7
-28	-2900	-2801	4.8
-29	-3000	-2901	4.9
-30	-3100	-3001	5
-31	-3200	-3101	5.1
-32	-3300	-3201	5.2
-33	-3400	-3301	5.3
-34	-3500	-3401	5.4
-35	-3600	-3501	5.5
-36	-3700	-3601	5.6
-37	-3800	-3701	5.7
-38	-3900	-3801	5.8
-39	-4000	-3901	5.9
-40	-4100	-4001	6
-41	-4200	-4101	6.1
-42	-4300	-4201	6.2
-43	-4400	-4301	6.3
-44	-4500	-4401	6.4
-45	-4600	-4501	6.5
-46	-4700	-4601	6.6
-47	-4800	-4701	6.7

-48	-4900	-4801	6.8
-49	-5000	-4901	6.9
-50	-5100	-5001	7
-51	-5200	-5101	7.1
-52	-5300	-5201	7.2
-53	-5400	-5301	7.3
-54	-5500	-5401	7.4
-55	-5600	-5501	7.5
-56	-5700	-5601	7.6
-57	-5800	-5701	7.7
-58	-5900	-5801	7.8
-59	-6000	-5901	7.9
-60	-6100	-6001	8
-61	-6200	-6101	8.1
-62	-6300	-6201	8.2
-63	-6400	-6301	8.3
-64	-6500	-6401	8.4
-65	-6600	-6501	8.5
-66	-6700	-6601	8.6
-67	-6800	-6701	8.7
-68	-6900	-6801	8.8
-69	-7000	-6901	8.9
-70	-7100	-7001	9
-71	-7200	-7101	9.1
-72	-7300	-7201	9.2
-73	-7400	-7301	9.3
-74	-7500	-7401	9.4
-75	-7600	-7501	9.5
-76	-7700	-7601	9.6
-77	-7800	-7701	9.7
-78	-7900	-7801	9.8
-79	-8000	-7901	9.9
-80	-8100	-8001	10
-81	-8200	-8101	10.1
-82	-8300	-8201	10.2
-83	-8400	-8301	10.3
-84	-8500	-8401	10.4
-85	-8600	-8501	10.5
-86	-8700	-8601	10.6
-87	-8800	-8701	10.7
-88	-8900	-8801	10.8
-89	-9000	-8901	10.9
-90	-9100	-9001	11
-91	-9200	-9101	11.1
-92	-9300	-9201	11.2
-93	-9400	-9301	11.3
-94	-9500	-9401	11.4

-95	-9600	-9501	11.5
-96	-9700	-9601	11.6
-97	-9800	-9701	11.7
-98	-9900	-9801	11.8
-99	-10000	-9901	11.9
-100	-10100	-10001	12
-101	-10200	-10101	12.1
-102	-10300	-10201	12.2
-103	-10400	-10301	12.3
-104	-10500	-10401	12.4
-105	-10600	-10501	12.5
-106	-10700	-10601	12.6
-107	-10800	-10701	12.7
-108	-10900	-10801	12.8
-109	-11000	-10901	12.9
-110	-11100	-11001	13
-111	-11200	-11101	13.1
-112	-11300	-11201	13.2
-113	-11400	-11301	13.3
-114	-11500	-11401	13.4
-115	-11600	-11501	13.5
-116	-11700	-11601	13.6
-117	-11800	-11701	13.7
-118	-11900	-11801	13.8
-119	-12000	-11901	13.9
-120	-12100	-12001	14
-121	-12200	-12101	14.1
-122	-12300	-12201	14.2
-123	-12400	-12301	14.3
-124	-12500	-12401	14.4
-125	-12600	-12501	14.5
-126	-12700	-12601	14.6
-127	-12800	-12701	14.7
-128	-12900	-12801	14.8
-129	-13000	-12901	14.9
-130	-13100	-13001	15
-131	-13200	-13101	15.1
-132	-13300	-13201	15.2
-133	-13400	-13301	15.3
-134	-13500	-13401	15.4
-135	-13600	-13501	15.5
-136	-13700	-13601	15.6
-137	-13800	-13701	15.7
-138	-13900	-13801	15.8
-139	-14000	-13901	15.9
-140	-14100	-14001	16
-141	-14200	-14101	16.1

-142	-14300	-14201	16.2
-143	-14400	-14301	16.3
-144	-14500	-14401	16.4
-145	-14600	-14501	16.5
-146	-14700	-14601	16.6
-147	-14800	-14701	16.7
-148	-14900	-14801	16.8
-149	-15000	-14901	16.9
-150	-15100	-15001	17
-151	-15200	-15101	17.1
-152	-15300	-15201	17.2
-153	-15400	-15301	17.3
-154	-15500	-15401	17.4
-155	-15600	-15501	17.5
-156	-15700	-15601	17.6
-157	-15800	-15701	17.7
-158	-15900	-15801	17.8
-159	-16000	-15901	17.9
-160	-16100	-16001	18
-161	-16200	-16101	18.1
-162	-16300	-16201	18.2
-163	-16400	-16301	18.3
-164	-16500	-16401	18.4
-165	-16600	-16501	18.5
-166	-16700	-16601	18.6
-167	-16800	-16701	18.7
-168	-16900	-16801	18.8
-169	-17000	-16901	18.9
-170	-17100	-17001	19
-171	-17200	-17101	19.1
-172	-17300	-17201	19.2
-173	-17400	-17301	19.3
-174	-17500	-17401	19.4
-175	-17600	-17501	19.5
-176	-17700	-17601	19.6
-177	-17800	-17701	19.7
-178	-17900	-17801	19.8
-179	-18000	-17901	19.9
-180	-18100	-18001	20
-181	-18200	-18101	20.1
-182	-18300	-18201	20.2
-183	-18400	-18301	20.3
-184	-18500	-18401	20.4
-185	-18600	-18501	20.5
-186	-18700	-18601	20.6
-187	-18800	-18701	20.7
-188	-18900	-18801	20.8

-189	-19000	-18901	20.9
-190	-19100	-19001	21
-191	-19200	-19101	21.1
-192	-19300	-19201	21.2
-193	-19400	-19301	21.3
-194	-19500	-19401	21.4
-195	-19600	-19501	21.5
-196	-19700	-19601	21.6
-197	-19800	-19701	21.7
-198	-19900	-19801	21.8
-199	-20000	-19901	21.9
-200	-20100	-20001	22

Table 5. timeID and sea level change relative to 1990 used in the downscaling. The slope and intercept used are given for the linear interpolation between timesteps from the original data.

timeID	slope	intercept	sealevel [m]	sealevel_int [m]
0	-0.00036	-122.2	-122.2	-122
1	-0.00036	-122.2	-122.2	-122
2	-0.00036	-122.2	-122.2	-122
3	-0.00036	-122.2	-122.2	-122
4	-0.00036	-122.2	-122.2	-122
5	-0.00036	-122.2	-122.2	-122
6	-0.00036	-122.2	-122.2	-122
7	-0.00036	-122.2	-122.2	-122
8	-0.00036	-122.2	-122.2	-122
9	-0.00036	-122.2	-122.2	-122
10	-0.00036	-115	-122.2	-122
11	-0.00036	-115	-122.164	-122
12	-0.00036	-115	-122.128	-122
13	-0.00036	-115	-122.092	-122
14	-0.00036	-115	-122.056	-122
15	-0.00036	-115	-122.02	-122
16	-0.00036	-115	-121.984	-122
17	-0.00036	-115	-121.948	-122
18	-0.00036	-115	-121.912	-122
19	-0.00036	-115	-121.876	-122
20	-0.00036	-115	-121.84	-122
21	-0.00036	-115	-121.804	-122
22	-0.00036	-115	-121.768	-122
23	-0.00036	-115	-121.732	-122
24	-0.00036	-115	-121.696	-122
25	-0.00036	-115	-121.66	-122
26	-0.00036	-115	-121.624	-122
27	-0.00036	-115	-121.588	-122
28	-0.00036	-115	-121.552	-122
29	-0.00036	-115	-121.516	-122

30	-0.00036	-115	-121.48	-121
31	-0.00036	-115	-121.444	-121
32	-0.00036	-115	-121.408	-121
33	-0.00036	-115	-121.372	-121
34	-0.00036	-115	-121.336	-121
35	-0.00036	-115	-121.3	-121
36	-0.00036	-115	-121.264	-121
37	-0.00036	-115	-121.228	-121
38	-0.00036	-115	-121.192	-121
39	-0.00036	-115	-121.156	-121
40	-0.00036	-115	-121.12	-121
41	-0.00036	-115	-121.084	-121
42	-0.00036	-115	-121.048	-121
43	-0.00036	-115	-121.012	-121
44	-0.00036	-115	-120.976	-121
45	-0.00036	-115	-120.94	-121
46	-0.00036	-115	-120.904	-121
47	-0.00036	-115	-120.868	-121
48	-0.00036	-115	-120.832	-121
49	-0.00036	-115	-120.796	-121
50	-0.00036	-115	-120.76	-121
51	-0.00036	-115	-120.724	-121
52	-0.00036	-115	-120.688	-121
53	-0.00036	-115	-120.652	-121
54	-0.00036	-115	-120.616	-121
55	-0.00036	-115	-120.58	-121
56	-0.00036	-115	-120.544	-121
57	-0.00036	-115	-120.508	-121
58	-0.00036	-115	-120.472	-120
59	-0.00036	-115	-120.436	-120
60	-0.00036	-115	-120.4	-120
61	-0.0136	83.6	-119.04	-119
62	-0.0136	83.6	-117.68	-118
63	-0.0136	83.6	-116.32	-116
64	-0.0136	83.6	-114.96	-115
65	-0.0136	83.6	-113.6	-114
66	-0.0136	83.6	-112.24	-112
67	-0.0136	83.6	-110.88	-111
68	-0.0136	83.6	-109.52	-110
69	-0.0136	83.6	-108.16	-108
70	-0.0136	83.6	-106.8	-107
71	-0.0136	83.6	-105.44	-105
72	-0.0136	83.6	-104.08	-104
73	-0.0136	83.6	-102.72	-103
74	-0.0136	83.6	-101.36	-101
75	-0.0136	83.6	-100	-100
76	-0.0136	83.6	-98.64	-99

77	-0.0136	83.6	-97.28	-97
78	-0.0136	83.6	-95.92	-96
79	-0.0136	83.6	-94.56	-95
80	-0.0136	83.6	-93.2	-93
81	-0.0136	83.6	-91.84	-92
82	-0.0136	83.6	-90.48	-90
83	-0.0136	83.6	-89.12	-89
84	-0.0136	83.6	-87.76	-88
85	-0.0136	83.6	-86.4	-86
86	-0.0136	83.6	-85.04	-85
87	-0.0136	83.6	-83.68	-84
88	-0.0136	83.6	-82.32	-82
89	-0.0136	83.6	-80.96	-81
90	-0.0136	83.6	-79.6	-80
91	-0.0136	83.6	-78.24	-78
92	-0.0136	83.6	-76.88	-77
93	-0.0136	83.6	-75.52	-76
94	-0.0136	83.6	-74.16	-74
95	-0.0136	83.6	-72.8	-73
96	-0.0136	83.6	-71.44	-71
97	-0.0136	83.6	-70.08	-70
98	-0.0136	83.6	-68.72	-69
99	-0.0136	83.6	-67.36	-67
100	-0.0136	83.6	-66	-66
101	-0.0136	83.6	-64.64	-65
102	-0.0136	83.6	-63.28	-63
103	-0.0136	83.6	-61.92	-62
104	-0.0136	83.6	-60.56	-61
105	-0.0136	83.6	-59.2	-59
106	-0.0136	83.6	-57.84	-58
107	-0.0136	83.6	-56.48	-56
108	-0.0136	83.6	-55.12	-55
109	-0.0136	83.6	-53.76	-54
110	-0.0136	83.6	-52.4	-52
111	-0.00982	45.8	-51.418	-51
112	-0.00982	45.8	-50.436	-50
113	-0.00982	45.8	-49.454	-49
114	-0.00982	45.8	-48.472	-48
115	-0.00982	45.8	-47.49	-47
116	-0.00982	45.8	-46.508	-47
117	-0.00982	45.8	-45.526	-46
118	-0.00982	45.8	-44.544	-45
119	-0.00982	45.8	-43.562	-44
120	-0.00982	45.8	-42.58	-43
121	-0.00982	45.8	-41.598	-42
122	-0.00982	45.8	-40.616	-41
123	-0.00982	45.8	-39.634	-40

124	-0.00982	45.8	-38.652	-39
125	-0.00982	45.8	-37.67	-38
126	-0.00982	45.8	-36.688	-37
127	-0.00982	45.8	-35.706	-36
128	-0.00982	45.8	-34.724	-35
129	-0.00982	45.8	-33.742	-34
130	-0.00982	45.8	-32.76	-33
131	-0.00982	45.8	-31.778	-32
132	-0.00982	45.8	-30.796	-31
133	-0.00982	45.8	-29.814	-30
134	-0.00982	45.8	-28.832	-29
135	-0.00982	45.8	-27.85	-28
136	-0.00982	45.8	-26.868	-27
137	-0.00982	45.8	-25.886	-26
138	-0.00982	45.8	-24.904	-25
139	-0.00982	45.8	-23.922	-24
140	-0.00982	45.8	-22.94	-23
141	-0.00982	45.8	-21.958	-22
142	-0.00982	45.8	-20.976	-21
143	-0.00982	45.8	-19.994	-20
144	-0.00982	45.8	-19.012	-19
145	-0.00982	45.8	-18.03	-18
146	-0.00982	45.8	-17.048	-17
147	-0.00982	45.8	-16.066	-16
148	-0.00982	45.8	-15.084	-15
149	-0.00982	45.8	-14.102	-14
150	-0.00982	45.8	-13.12	-13
151	-0.00982	45.8	-12.138	-12
152	-0.00982	45.8	-11.156	-11
153	-0.00982	45.8	-10.174	-10
154	-0.00982	45.8	-9.192	-9
155	-0.00982	45.8	-8.21	-8
156	-0.00982	45.8	-7.228	-7
157	-0.00982	45.8	-6.246	-6
158	-0.00982	45.8	-5.264	-5
159	-0.00982	45.8	-4.282	-4
160	-0.00982	45.8	-3.3	-3
161	-0.00066	0	-3.234	-3
162	-0.00066	0	-3.168	-3
163	-0.00066	0	-3.102	-3
164	-0.00066	0	-3.036	-3
165	-0.00066	0	-2.97	-3
166	-0.00066	0	-2.904	-3
167	-0.00066	0	-2.838	-3
168	-0.00066	0	-2.772	-3
169	-0.00066	0	-2.706	-3
170	-0.00066	0	-2.64	-3

171	-0.00066	0	-2.574	-3
172	-0.00066	0	-2.508	-3
173	-0.00066	0	-2.442	-2
174	-0.00066	0	-2.376	-2
175	-0.00066	0	-2.31	-2
176	-0.00066	0	-2.244	-2
177	-0.00066	0	-2.178	-2
178	-0.00066	0	-2.112	-2
179	-0.00066	0	-2.046	-2
180	-0.00066	0	-1.98	-2
181	-0.00066	0	-1.914	-2
182	-0.00066	0	-1.848	-2
183	-0.00066	0	-1.782	-2
184	-0.00066	0	-1.716	-2
185	-0.00066	0	-1.65	-2
186	-0.00066	0	-1.584	-2
187	-0.00066	0	-1.518	-2
188	-0.00066	0	-1.452	-1
189	-0.00066	0	-1.386	-1
190	-0.00066	0	-1.32	-1
191	-0.00066	0	-1.254	-1
192	-0.00066	0	-1.188	-1
193	-0.00066	0	-1.122	-1
194	-0.00066	0	-1.056	-1
195	-0.00066	0	-0.99	-1
196	-0.00066	0	-0.924	-1
197	-0.00066	0	-0.858	-1
198	-0.00066	0	-0.792	-1
199	-0.00066	0	-0.726	-1
200	-0.00066	0	-0.66	-1
201	-0.00066	0	-0.594	-1
202	-0.00066	0	-0.528	-1
203	-0.00066	0	-0.462	0
204	-0.00066	0	-0.396	0
205	-0.00066	0	-0.33	0
206	-0.00066	0	-0.264	0
207	-0.00066	0	-0.198	0
208	-0.00066	0	-0.132	0
209	-0.00066	0	-0.066	0
210	-0.00066	0	0	0
211	-0.00066	0	0	0
212	-0.00066	0	0	0
213	-0.00066	0	0	0
214	-0.00066	0	0	0
215	-0.00066	0	0	0
216	-0.00066	0	0	0
217	-0.00066	0	0	0

218	-0.00066	0	0	0
219	-0.00066	0	0	0
220	-0.00066	0	0	0
221	-0.00066	0	0	0