Padul Data: MI and Precip. corrections

Calculate daily temperature (modern)

CRU TS 4.04 daily interpolations from monthly data:

```
path <- "/path/to/CRU/4.04/"
tmin <- file.path(path, "cru_ts4.04.1901.2019.tmn.dat-clim-1961-1990-int.nc")
tmax <- file.path(path, "cru_ts4.04.1901.2019.tmx.dat-clim-1961-1990-int.nc")
output_filename <- file.path(path, "cru_ts4.04-clim-1961-1990-daily.tmp.nc")
codos::daily_temp(tmin = list(filename = tmin, id = "tmn"),
                  tmax = list(filename = tmax, id = "tmx"),
                  output_filename = output_filename)
```

Output file

```
"cru_ts4.04-clim-1961-1990-daily.tmp.nc"
```

Calculate mean growing season for daily temperature (`tmp`)

```
codos::nc_gs("cru_ts4.04-clim-1961-1990-daily.tmp.nc", "tmp", thr = 0, cpus = 10)
```

Output file

```
"cru_ts4.04-clim-1961-1990-daily.tmp-gs.nc"
```

Padul location: 37.0108, -3.6039

```
Tmp <- codos:::nc_var_get(file.path(path, "cru_ts4.04-clim-1961-1990-daily.tmp-gs.nc"),
                          "tmp")
lat <- codos:::nc_var_get(file.path(path, "cru_ts4.04-clim-1961-1990-daily.tmp-gs.nc"),
                          "lat")
lon <- codos:::nc_var_get(file.path(path, "cru_ts4.04-clim-1961-1990-daily.tmp-gs.nc"),
                          "lon")
idx_y <- which.min(abs(lat$data - 37.0108))
idx_x <- which.min(abs(lon$data + 3.6039))

aux <- Tmp$data[c(idx_x, idx_x + 1), c(idx_y - 1, idx_y)]
rownames(aux) <- lat$data[c(idx_y, idx_y - 1)]
colnames(aux) <- lon$data[c(idx_x, idx_x + 1)]
aux
```

```
#>         -3.75    -3.25
#> 37.25 15.9465 14.80801
#> 36.75 15.2319 11.76962
```

```
(modern_tmp <- mean(aux))
```

```
#> [1] 14.43901
```

Reconstruct past temperature from `T_djf` and `T_jja`:

```
padul <- readr::read_csv("/path/to/padul.csv")
```

```
padul_tmp <- rowMeans(padul[, c("T_djf", "T_jja")])
```

Calculate daily mean temperature

Obtain past CO2 from (Bereiter et al. 2015)

```
past_co2 <- purrr::map_dbl(padul$age_cal_yr_BP, codos::past_co2)
```

Obtain modern CO2 from (Bereiter et al. 2015)

```
modern_co2 <- tibble::tibble(age = 1950 - c(1961:1990),
                             co2 = purrr::map_dbl(age, codos::past_co2)) %>%
  .$co2 %>%
  mean()
```

Assemble the Padul data

```
padul2 <- tibble::tibble(age_calBP = padul$age_cal_yr_BP,
                         past_temp = padul_tmp,
                         past_co2 = past_co2,
                         modern_co2 = modern_co2, # 340,
                         present_t = padul_tmp, # modern_tmp,
                         recon_mi = padul$MI)
```

Find the corrected `MI`

```
padul2$corrected_mi <- codos::corrected_mi(padul2$present_t,
                                           padul2$past_temp,
                                           padul2$recon_mi,
                                           padul2$modern_co2,
                                           padul2$past_co2)
# Small subset
knitr::kable(head(padul2, 5))
```

age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corrected_mi
-62	13.15918	368.020	332.1725	13.15918	0.425809	0.3760617
-56	12.86272	368.020	332.1725	12.86272	0.471798	0.4221282
-50	11.88472	364.900	332.1725	11.88472	0.506921	0.4618115
-43	13.09339	353.835	332.1725	13.09339	0.566461	0.5349721
-38	12.20387	346.520	332.1725	12.20387	0.528049	0.5071456

Check out and download the entire dataset in Appendix A5.

Find the corrected Annual Precipitation, `P_ann`

Approximated as the ratio

$$\text{MI}_{\text{ratio}} = \frac{\text{corrected}}{\text{reconstructed}}$$

multiplied by reconstructed `P_ann`.

```
mi_ratio <- padul2$corrected_mi / padul2$recon_mi
padul2$corrected_P_ann <- padul$P_ann * mi_ratio
```

```
padul2 %>%
  write.csv(file = "padul-with-corrected-mi.csv",
            row.names = FALSE)

# Small subset
knitr::kable(head(padul2, 15))
```

age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corrected_mi	corrected_P_ann
-62	13.15918	368.020	332.1725	13.15918	0.425809	0.3760617	405.2045
-56	12.86272	368.020	332.1725	12.86272	0.471798	0.4221282	453.2860
-50	11.88472	364.900	332.1725	11.88472	0.506921	0.4618115	519.8011
-43	13.09339	353.835	332.1725	13.09339	0.566461	0.5349721	595.1792
-38	12.20387	346.520	332.1725	12.20387	0.528049	0.5071456	531.4777
-31	11.87980	337.155	332.1725	11.87980	0.522880	0.5154727	513.9939
-25	11.49567	331.960	332.1725	11.49567	0.562884	0.5632035	577.1264
-19	12.52563	325.080	332.1725	12.52563	0.438233	0.4491932	506.4780
-13	12.88969	318.840	332.1725	12.88969	0.468382	0.4895393	563.6869
-6	13.13016	315.340	332.1725	13.13016	0.483879	0.5110105	581.0153
-1	12.70126	312.000	332.1725	12.70126	0.493117	0.5257439	586.4524
6	12.72497	311.290	332.1725	12.72497	0.490124	0.5239778	559.4817
12	11.81530	311.730	332.1725	11.81530	0.524648	0.5573327	580.8138
18	11.88823	308.260	332.1725	11.88823	0.528909	0.5676032	579.8308
24	13.54031	304.970	332.1725	13.54031	0.429877	0.4752671	508.5630

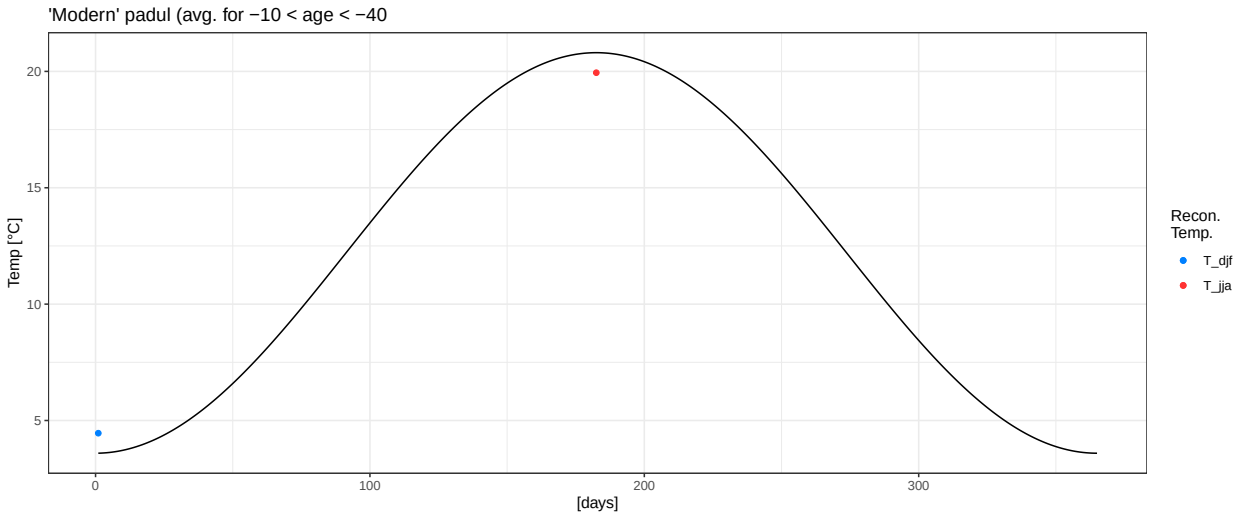
Check out and download the entire dataset in Appendix A5.

New corrections

Calculate temperature anomalies

Using both T_{djf} and T_{jja} for each record, a sinusoidal curve was fitted using the `int_sin` function.

```
padul <- padul %>%
  dplyr::mutate(Tmean = (T_jja + T_djf) / 2) %>%
  dplyr::mutate(Tmax = Tmean + (T_jja - Tmean) / 0.9) %>%
  dplyr::mutate(Tmin = Tmean + (T_djf - Tmean) / 0.9)
```



Rows 5:9 were used as the baseline to calculate the temperature anomalies.

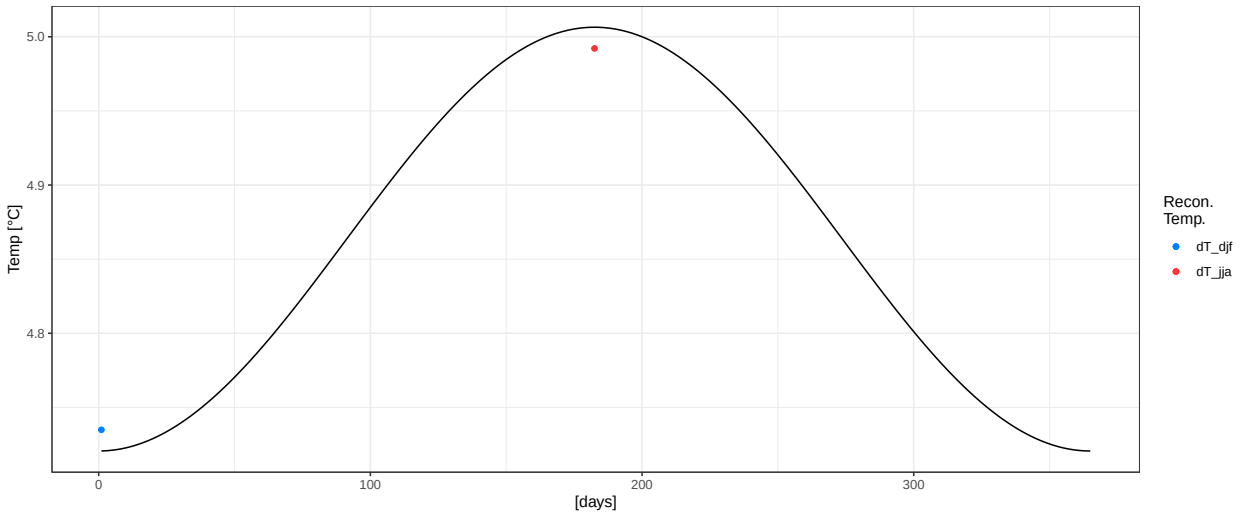
age_cal_yr_BP	MI	P_ann	T_djf	T_jja	Tmean	Tmax	Tmin
-38	0.5280490	553.3840	4.408130	19.99960	12.20387	20.86579	3.541937
-31	0.5228800	521.3800	3.954800	19.80480	11.87980	20.68536	3.074244
-25	0.5628840	576.7990	3.768040	19.22330	11.49567	20.08193	2.909414
-19	0.4382330	494.1200	5.015460	20.03580	12.52563	20.87026	4.180997
-13	0.4683820	539.3250	5.126590	20.65280	12.88969	21.51537	4.264023
	0.5040856	537.0016	4.454604	19.94326	12.19893	20.80374	3.594123

where

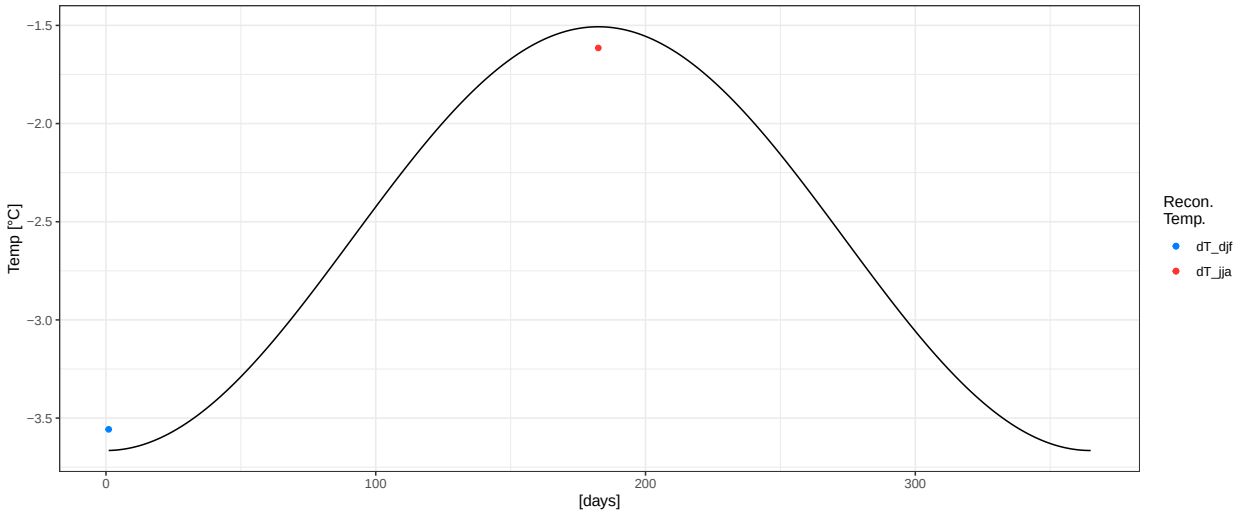
$$T_{\text{mean}} = (T_{\text{jja}} + T_{\text{djf}})/2$$
$$T_{\text{max}} = T_{\text{mean}} + (T_{\text{jja}} - T_{\text{mean}})/0.9$$
$$T_{\text{min}} = T_{\text{mean}} + (T_{\text{djf}} - T_{\text{mean}})/0.9$$

```
padul_anomalies <- seq_len(nrow(padul)) %>%
  purrr::map(~codos::int_sin(padul$Tmin[.x] - padul_modern$Tmin,
                             padul$Tmax[.x] - padul_modern$Tmax))
```

Padul: Anomaly for age = 11044 cal yr BP



Padul: Anomaly for age = 21048 cal yr BP

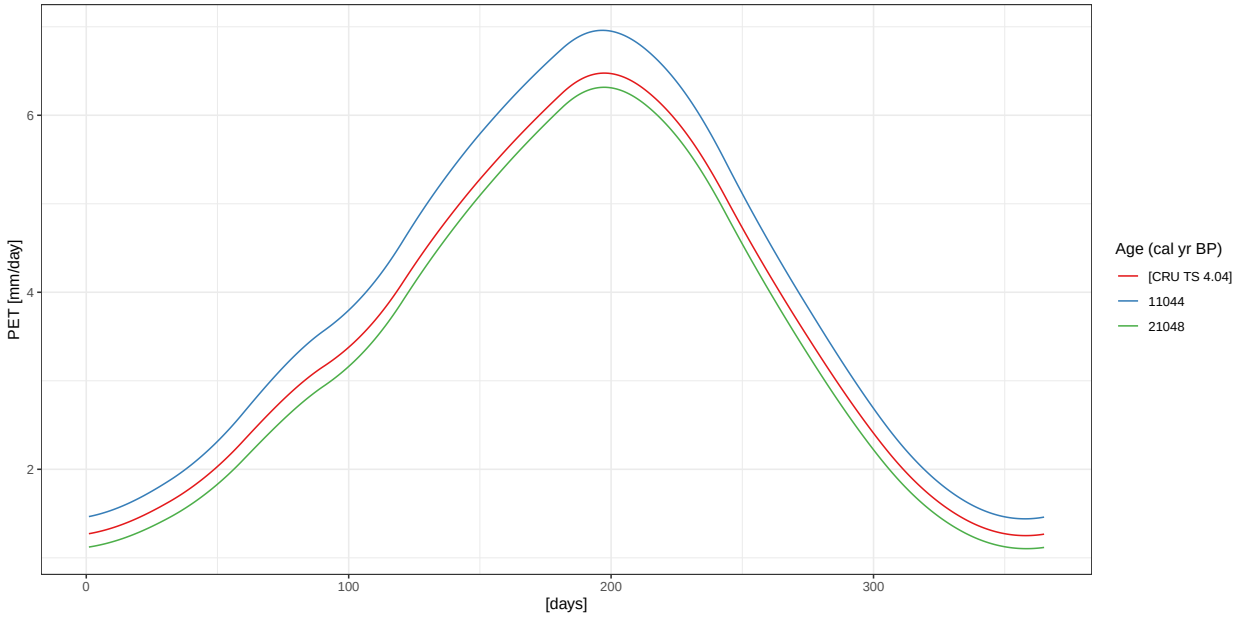


Calculate potential evapotranspiration (PET)

Padul location: 37.0108, -3.6039

Params (`splash::calc_daily_evap`)

- Latitude: `37.0108`
- Elevation: 959
- Year: `1961`
- Sunshine fraction: [`CRU TS 4.04`]
- Temperature: [`CRU TS 4.04`] $+T_{\text{anomalies}}$



Calculate corrected Precipitation

Using corrected MI and PET (calculated from modern temperature [CRU TS 4.04] and Padul temperature anomalies).

$$\text{corrected P}_{\text{ann}} = \text{MI} \times \text{PET}_{\text{ann}}$$

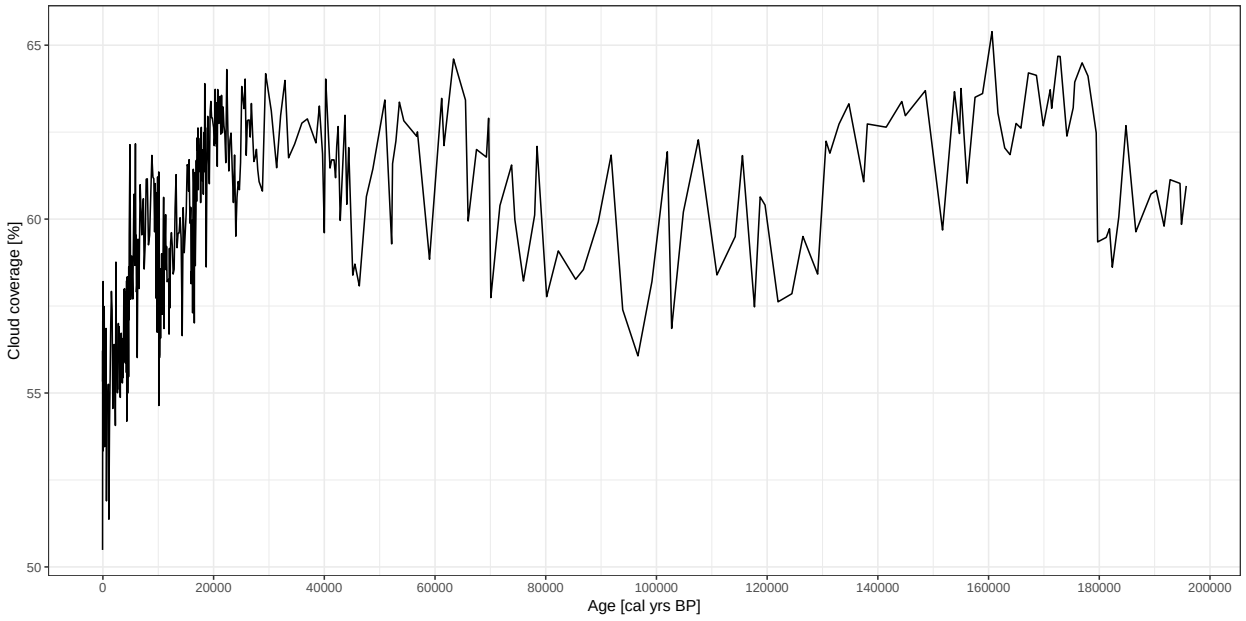
age_cal_yr_BP	MI	P_ann	corrected_mi	corrected_P_ann (MI ratio)	corrected_P_ann (Tmp anomalies)
-62	0.425809	458.807	0.3760617	405.2045	499.9298
-56	0.471798	506.622	0.4221282	453.2860	557.1540
-50	0.506921	570.575	0.4618115	519.8011	596.8046
-43	0.566461	630.212	0.5349721	595.1792	707.7181
-38	0.528049	553.384	0.5071456	531.4777	660.6057
-31	0.522880	521.380	0.5154727	513.9939	667.2190
-25	0.562884	576.799	0.5632035	577.1264	722.1962
-19	0.438233	494.120	0.4491932	506.4780	588.3135

age_cal_yr_BP	MI	P_ann	corrected_mi	corrected_P_ann (MI ratio)	corrected_P_ann (Tmp anomalies)
-13	0.468382	539.325	0.4895393	563.6869	646.8836
-6	0.483879	550.167	0.5110105	581.0153	678.3150
-1	0.493117	550.058	0.5257439	586.4524	691.8980
6	0.490124	523.334	0.5239778	559.4817	690.0008
12	0.524648	546.752	0.5573327	580.8138	720.9606
18	0.528909	540.303	0.5676032	579.8308	733.7108
24	0.429877	459.993	0.4752671	508.5630	637.3849
4679	0.477212	581.116	0.5963409	726.1829	812.2918
4693	0.481918	551.825	0.6022659	689.6305	843.0290
4707	0.448255	542.514	0.5644445	683.1358	763.6573
4723	0.462332	582.651	0.5792672	730.0178	787.8012
4756	0.535625	621.786	0.6540205	759.2267	896.3299
4890	0.650277	719.723	0.7696249	851.8166	1054.9631
11499	0.513904	551.458	0.6411031	687.9523	891.3187
11594	0.462316	437.416	0.6028879	570.4168	828.2252
11888	0.445394	459.323	0.6054149	624.3483	837.3106
11954	0.389403	378.477	0.5505438	535.0964	740.8549
12022	0.465376	479.259	0.6389500	658.0110	875.4846
12091	0.417931	412.517	0.5759886	568.5271	782.8678
21433	0.490850	589.305	0.8447341	1014.1714	1009.5154
21574	0.417916	390.909	0.7867675	735.9242	1011.1917
21716	0.460863	528.718	0.8260547	947.6786	1042.9041
21866	0.455234	449.707	0.7973193	787.6390	963.6841
22031	0.430449	511.119	0.7847700	931.8429	991.8851
22197	0.408191	417.690	0.7445526	761.8791	911.7161
184818	0.499713	478.917	0.7973629	764.1799	933.3303
186603	0.368120	373.086	0.6578863	666.7613	855.4144
189340	0.464490	442.187	0.7035537	669.7718	891.4097
190307	0.506649	612.275	0.7081428	855.7761	850.8198
191709	0.442095	502.227	0.6644589	754.8359	832.7850
192795	0.479334	474.041	0.7219279	713.9561	898.9643
194581	0.496187	495.060	0.7171165	715.4877	897.7381
194846	0.441957	453.222	0.6665682	683.5583	857.0024
195710	0.478354	491.296	0.7138342	733.1472	918.2379

Calculate cloud coverage from corrected MI

```
padul_cld_corrected_mi <- padul2$corrected_mi %>%
  purrr::map_dbl(codos::cld)
```

Padul: cloud coverage

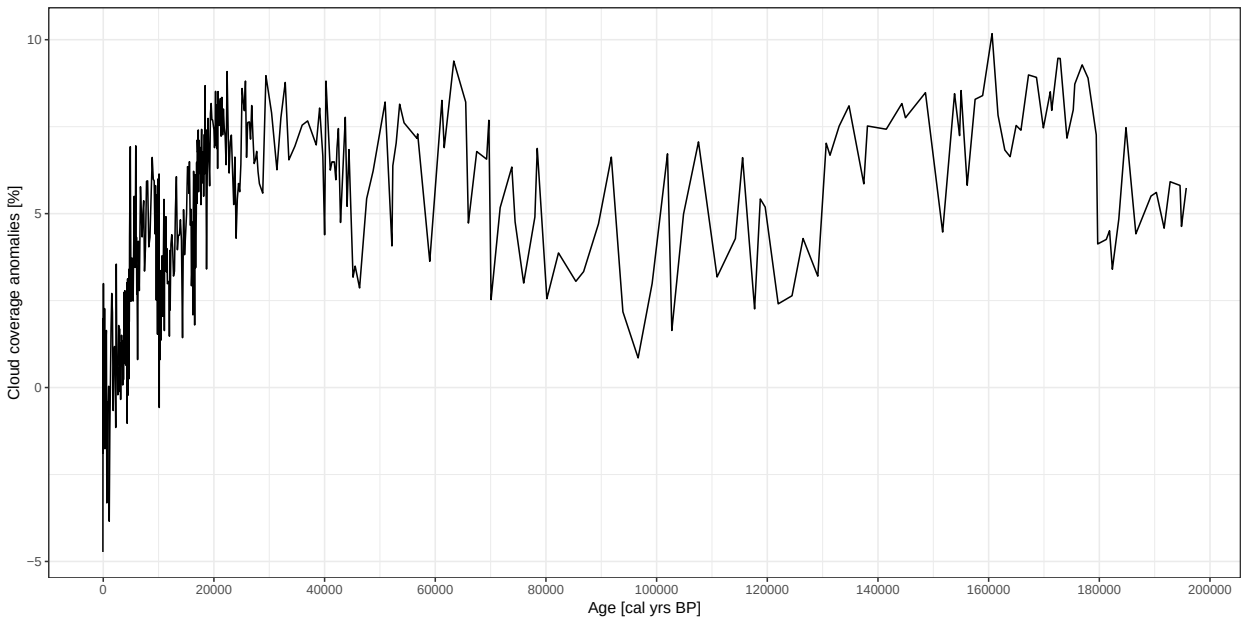


Calculate cloud coverage anomalies

Rows 5:9 were used as the baseline to calculate the anomalies:

```
padul_cld_anomalies <- seq_len(nrow(padul)) %>%
  purrr::map_dbl(~padul_cld_corrected_mi[.x] - ref_pdul_cld_corrected_mi)
```

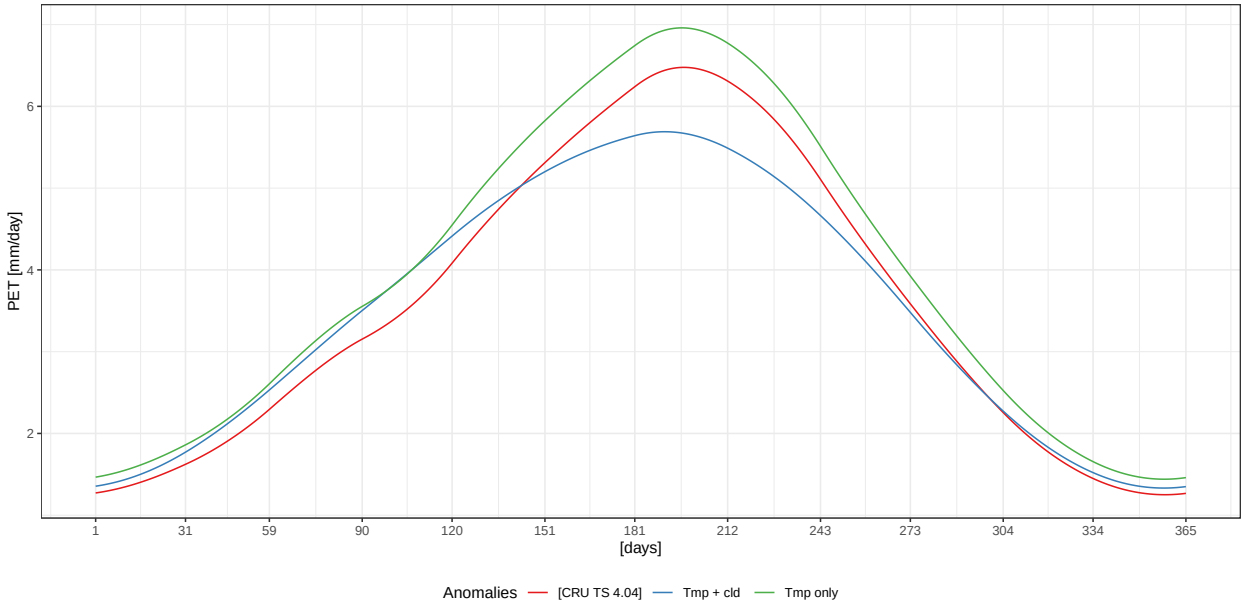
Padul: cloud coverage anomalies



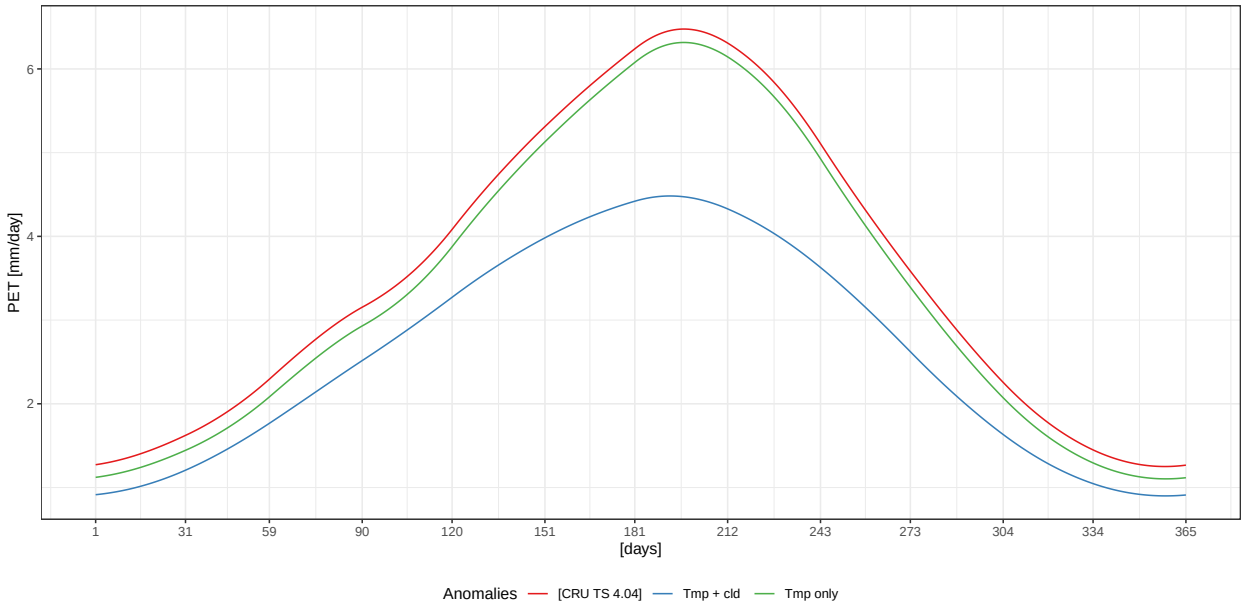
Re-calculate potential evapotranspiration (PET)

After including temperature and cloud coverage anomalies.

Padul: PET for age = 11044 cal yr BP



Padul: PET for age = 21048 cal yr BP



Re-calculate corrected precipitation

```
padul_corrected_pr_tmp_cld <- purrr::map_dbl(seq_along(padul_pet_tmp_cld),
                                             ~sum(padul_pet_tmp_cld[.x][[1]], na.rm = TRUE) * padul2$correc
```

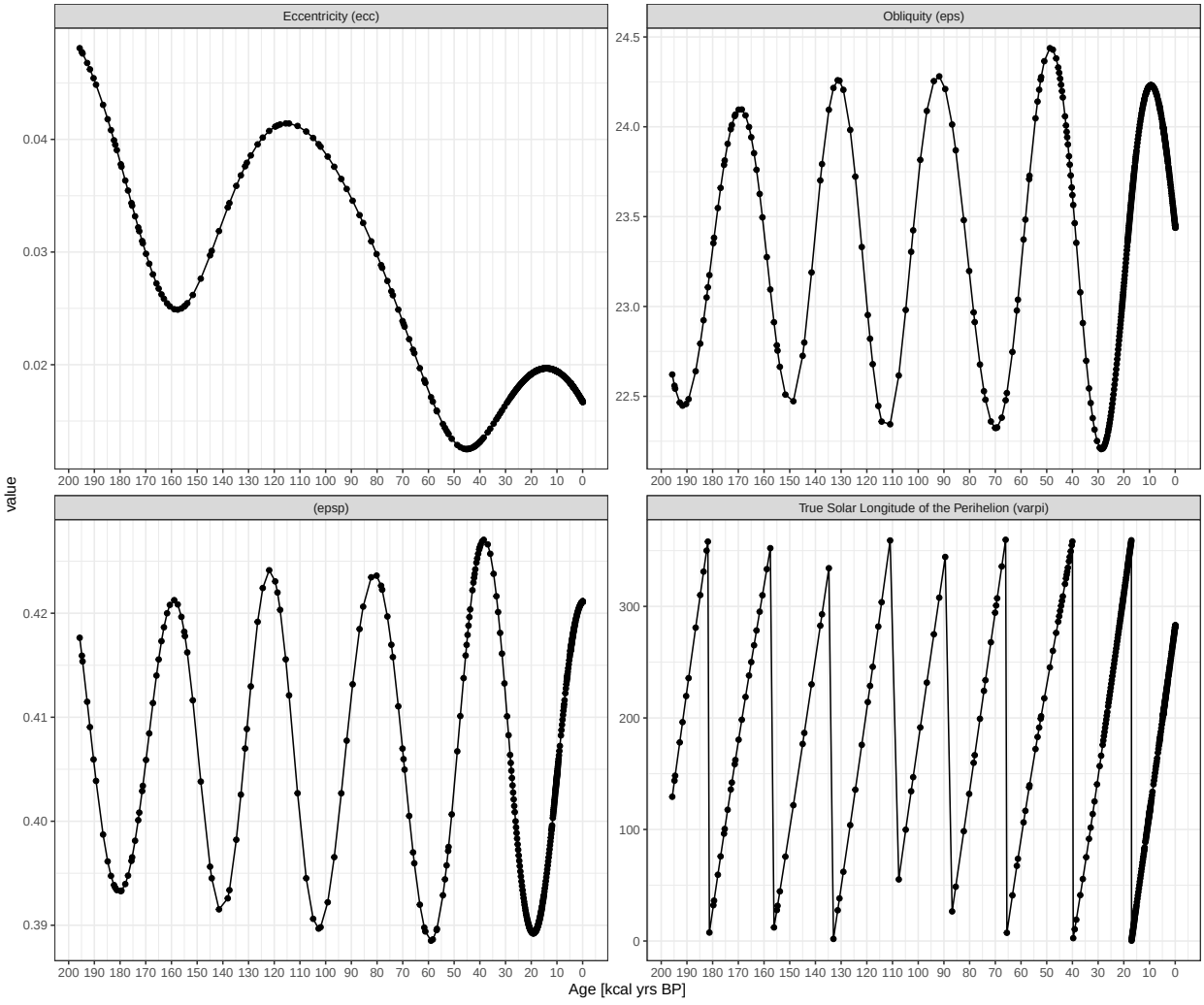
age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corrected_mi	corrected_P_ann
-62	13.159180	368.020	332.1725	13.159180	0.425809	0.3760617	501.7593
-56	12.862720	368.020	332.1725	12.862720	0.471798	0.4221282	540.8204
-50	11.884725	364.900	332.1725	11.884725	0.506921	0.4618115	563.5078
-43	13.093390	353.835	332.1725	13.093390	0.566461	0.5349721	637.6598
-38	12.203865	346.520	332.1725	12.203865	0.528049	0.5071456	605.3940
10536	16.278340	267.200	332.1725	16.278340	0.464915	0.5944521	729.4177
10612	16.047825	267.200	332.1725	16.047825	0.503634	0.6329492	757.8950
10690	16.485350	266.450	332.1725	16.485350	0.448163	0.5799232	720.8254
10762	16.975485	266.000	332.1725	16.975485	0.435743	0.5698094	719.3194
10835	17.668380	265.550	332.1725	17.668380	0.473725	0.6112321	762.3691
10904	15.477845	266.350	332.1725	15.477845	0.524962	0.6551246	766.3287
10972	15.780770	266.200	332.1725	15.780770	0.567718	0.6994155	805.1036
11044	17.062450	266.200	332.1725	17.062450	0.422194	0.5558639	708.9196
11113	14.071460	264.800	332.1725	14.071460	0.541849	0.6725019	758.6619
11187	16.074465	265.150	332.1725	16.074465	0.490152	0.6244606	750.8257
11258	17.405490	264.400	332.1725	17.405490	0.513015	0.6531101	793.2889
21048	9.612870	189.635	332.1725	9.612870	0.481180	0.8280077	791.1405
21173	10.006380	189.225	332.1725	10.006380	0.491841	0.8428966	805.6762
21301	10.426695	188.645	332.1725	10.426695	0.430404	0.7847688	776.4041
21433	8.329884	186.235	332.1725	8.329884	0.490850	0.8447341	775.4839
21574	11.400080	186.595	332.1725	11.400080	0.417916	0.7867675	796.3219
21716	10.645230	186.595	332.1725	10.645230	0.460863	0.8260547	807.4787
21866	8.680892	189.370	332.1725	8.680892	0.455234	0.7973193	755.0758
22031	10.720585	189.080	332.1725	10.720585	0.430449	0.7847700	781.9367
22197	9.247492	191.270	332.1725	9.247492	0.408191	0.7445526	731.8058

PET with orbital parameters

Find orbital parameters

Selected samples and their orbital parameters:

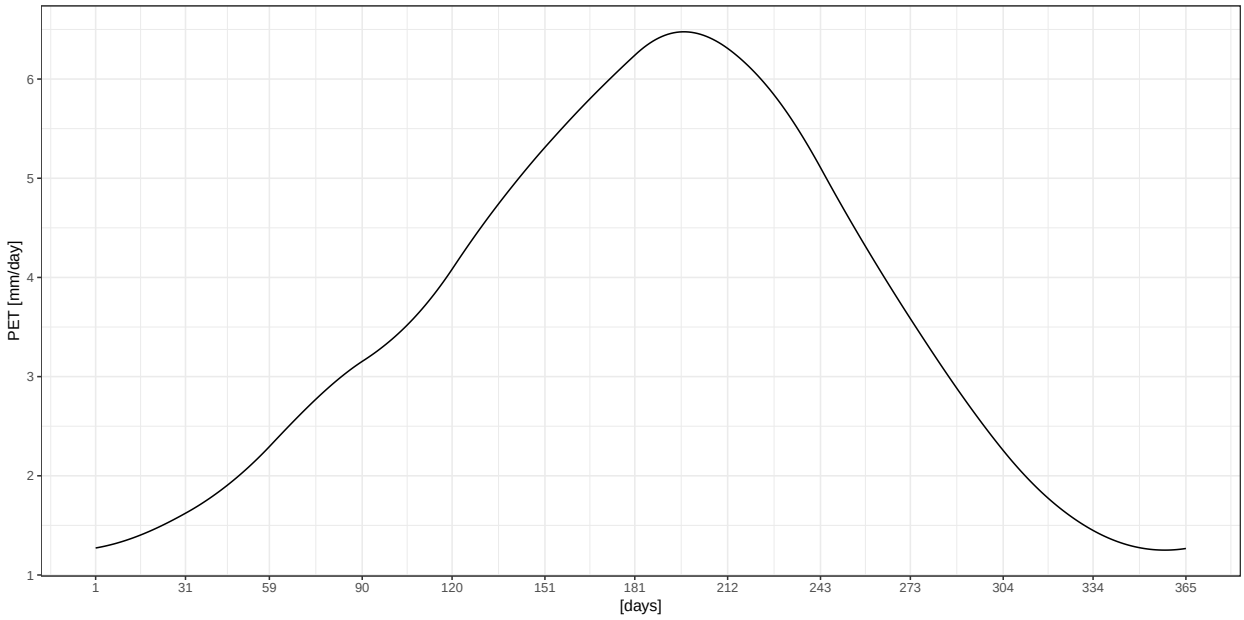
year	eps	ecc	varpi	epsp
-62	23.43821	0.0166988	283.10107	0.4211302
-56	23.43899	0.0167012	282.99828	0.4211293
-50	23.43977	0.0167037	282.89549	0.4211284
-43	23.44068	0.0167065	282.77558	0.4211273
6007	24.10588	0.0186835	180.75324	0.4138745
11044	24.19953	0.0195329	97.68662	0.4016794
21048	22.94125	0.0189846	293.63418	0.3900594
195710	22.62131	0.0480977	129.31171	0.4176410



Plots

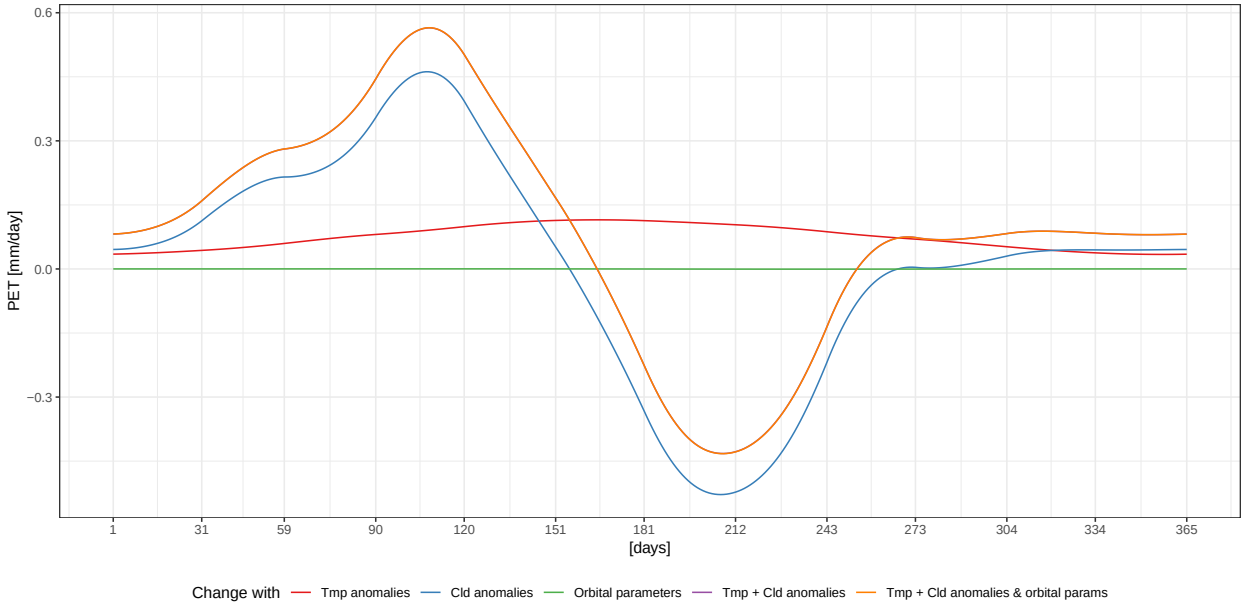
Modern PET

Obtained from CRU TS 4.04

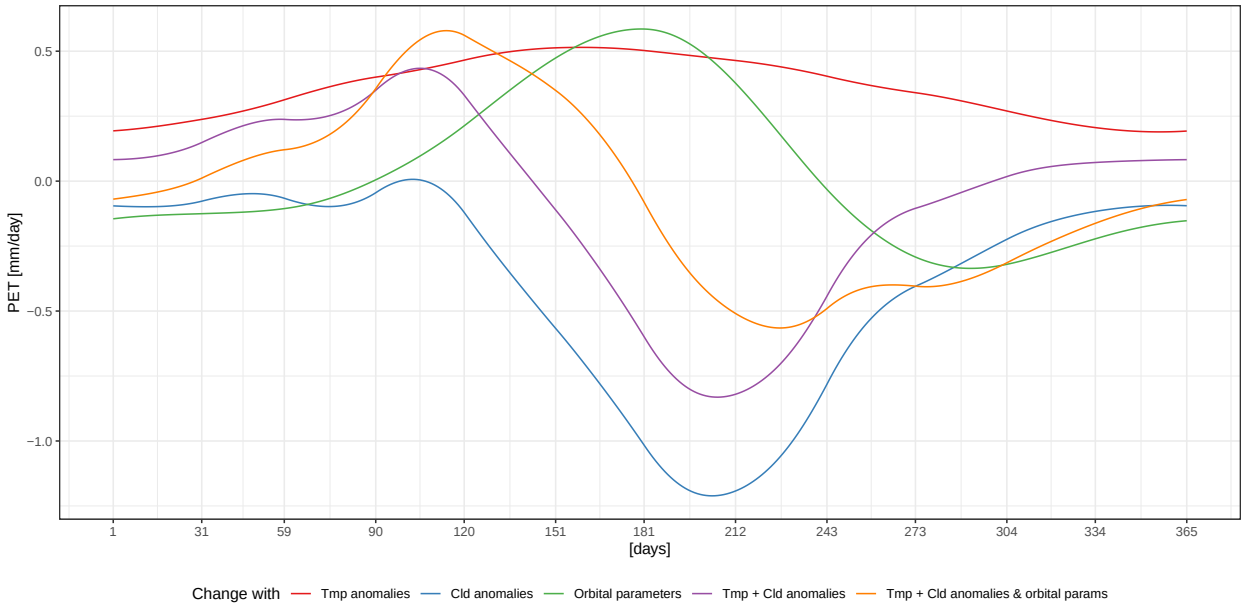


PET changes

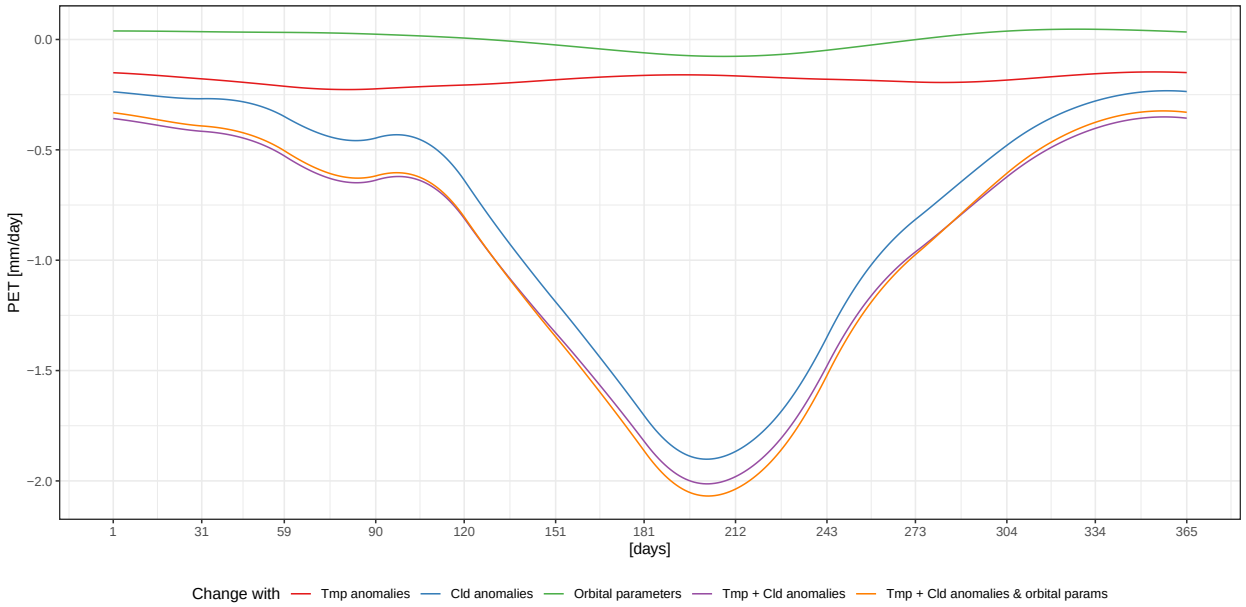
Padul: PET for age = -62 cal yr BP



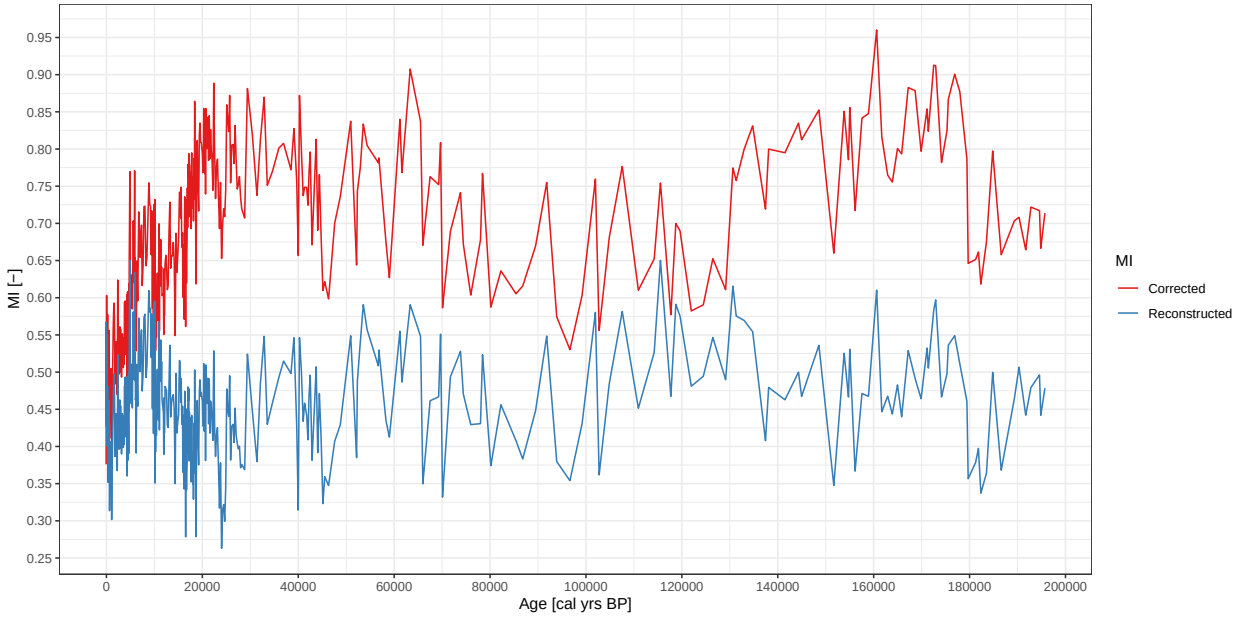
Padul: PET for age = 11044 cal yr BP



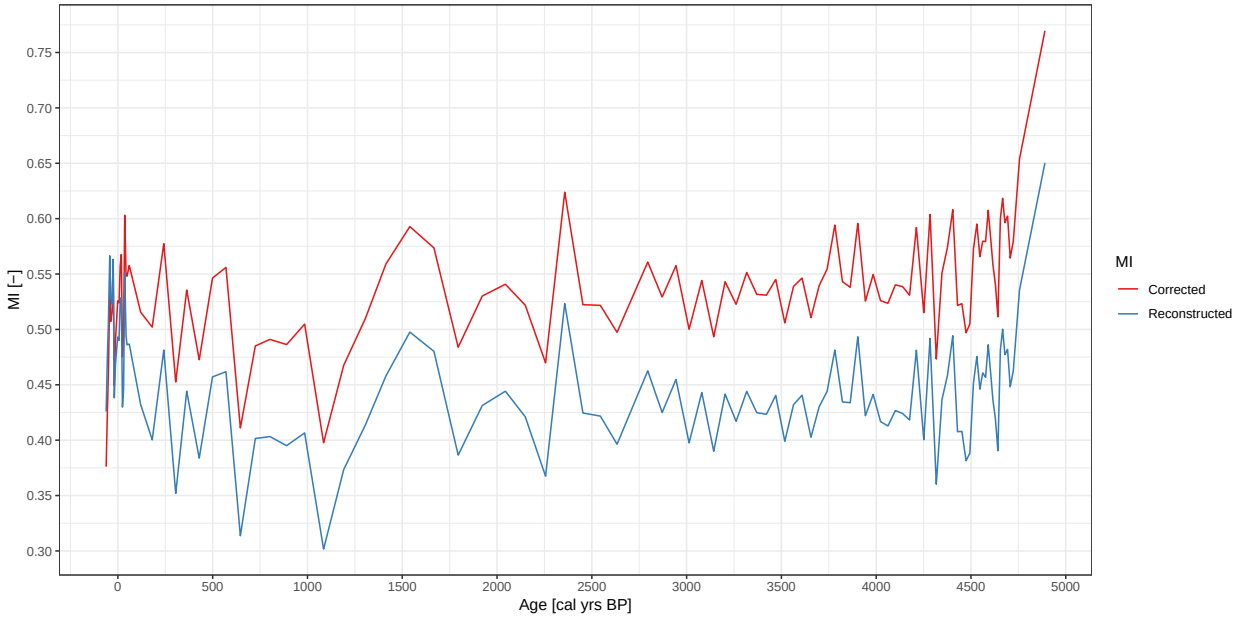
Padul: PET for age = 21048 cal yr BP



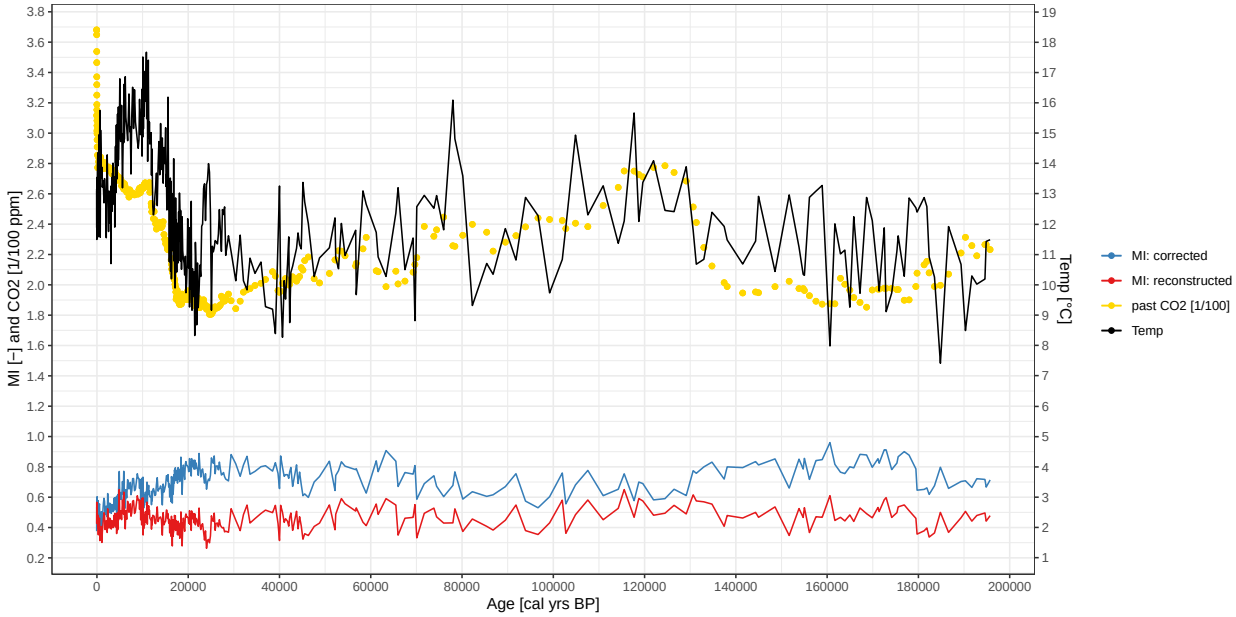
Reconstructed vs corrected MI: Past CO2 calculated using mean



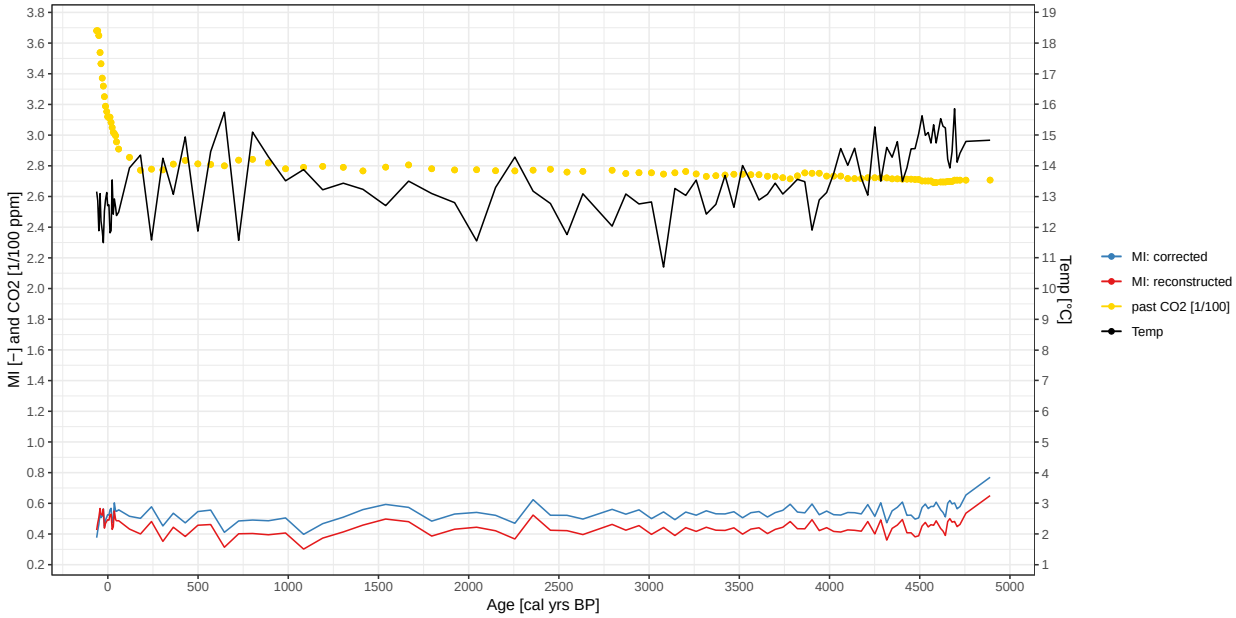
- age < 5k



Include past CO2 and Temperature

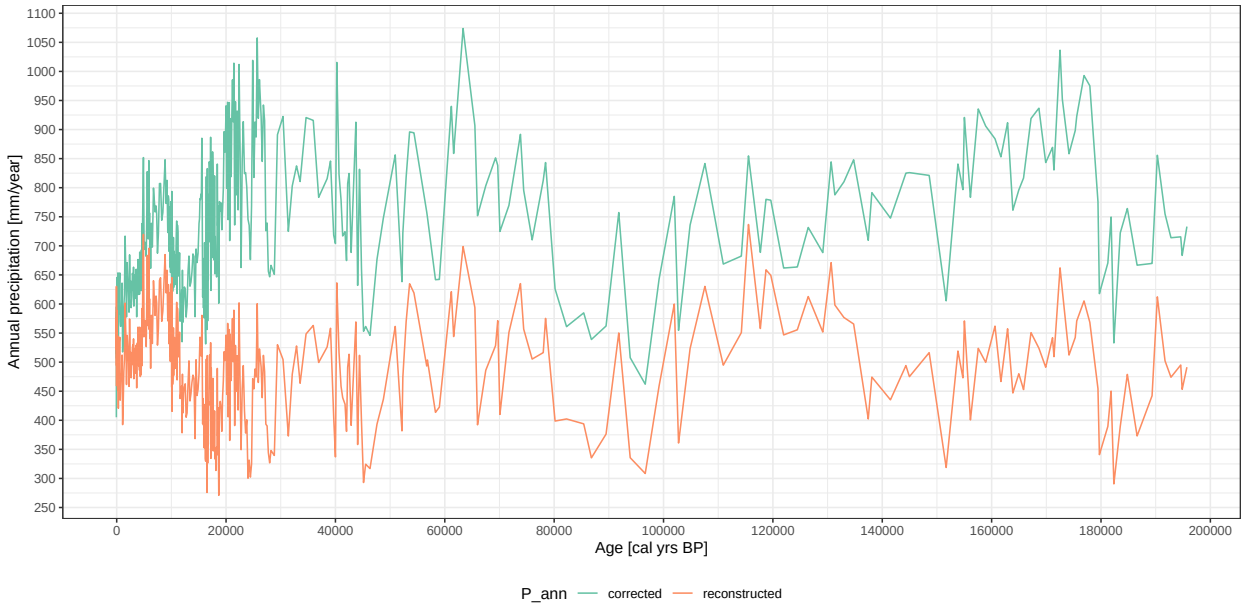


- `age < 5k`

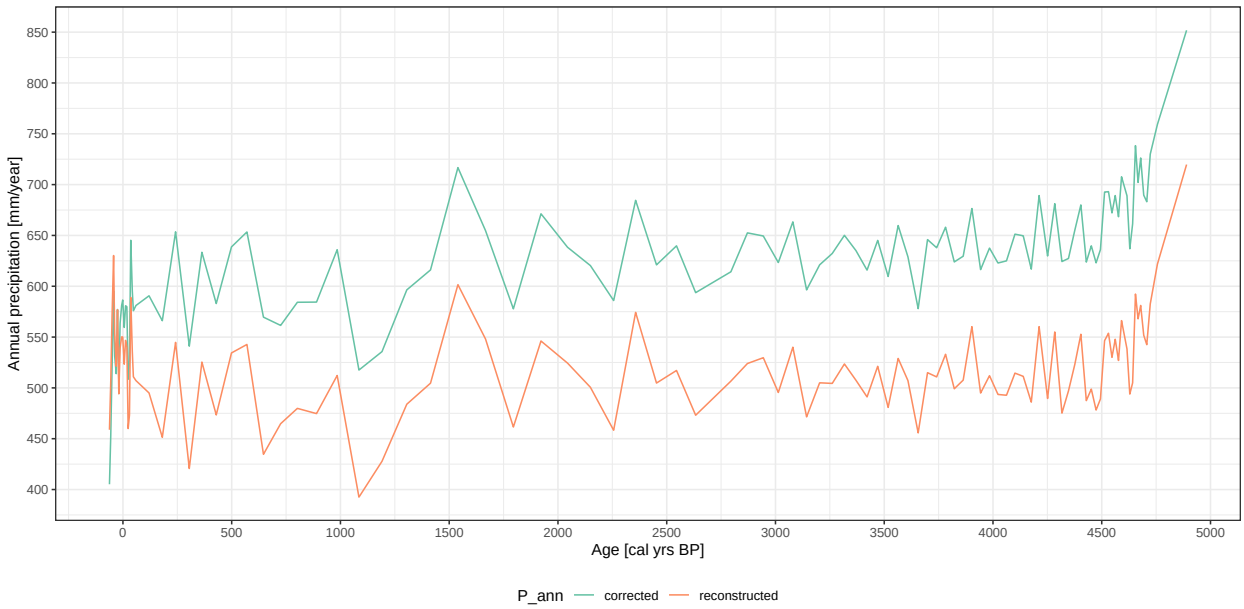


Reconstructed vs corrected `P_ann`: Past CO2 calculated using `mean`

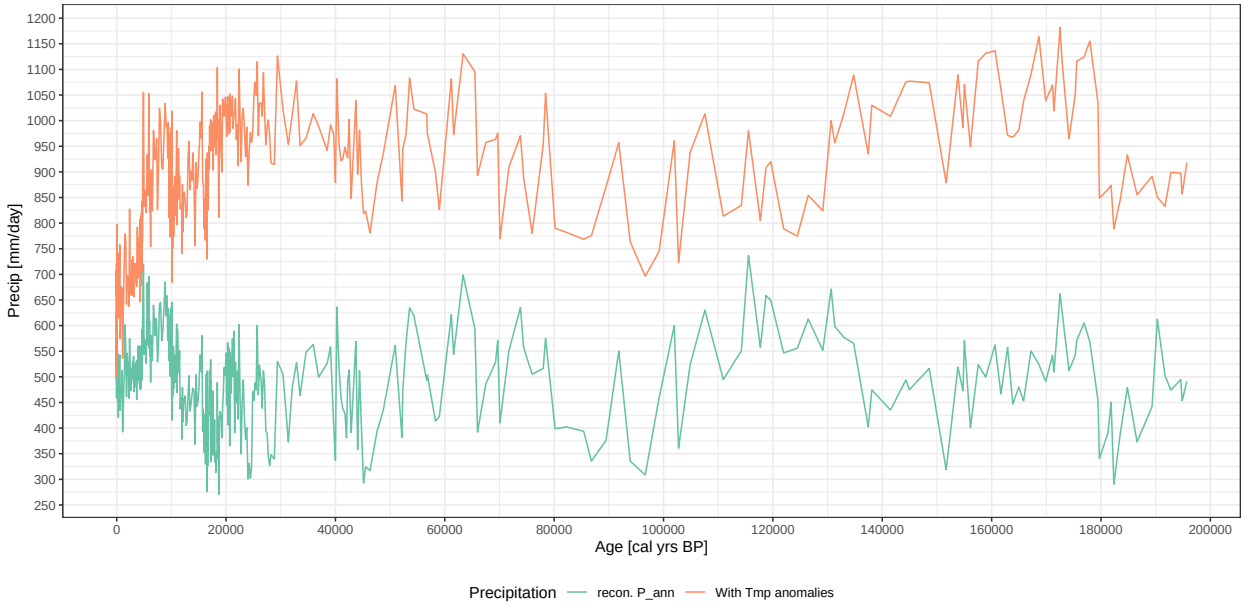
With MI ratio



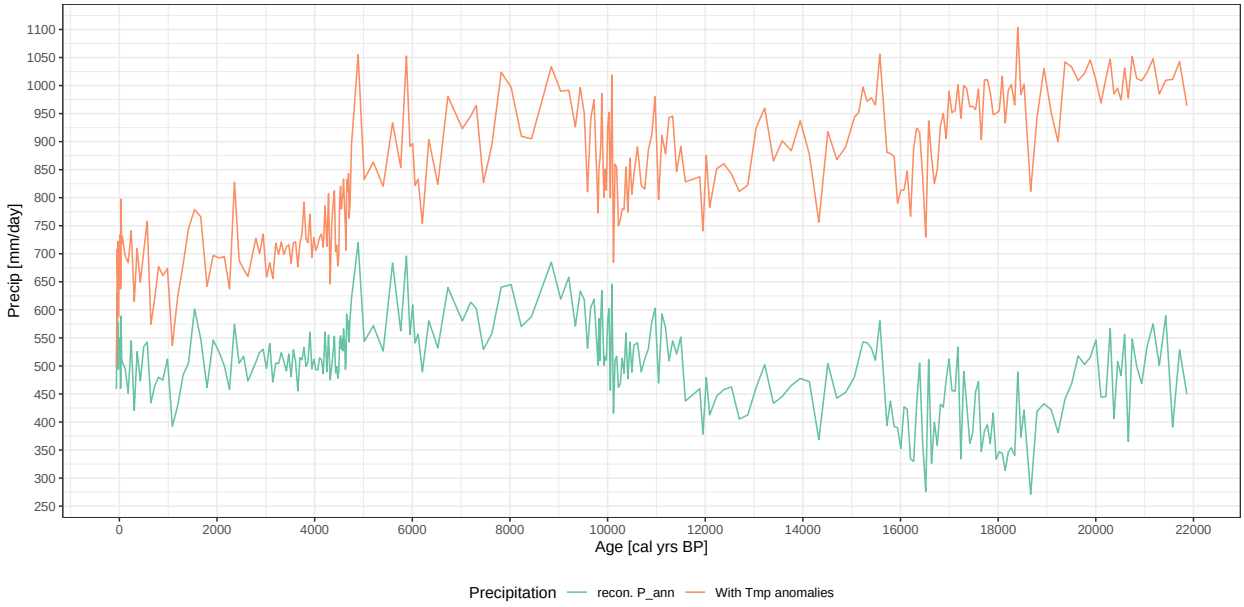
- `age < 5k`



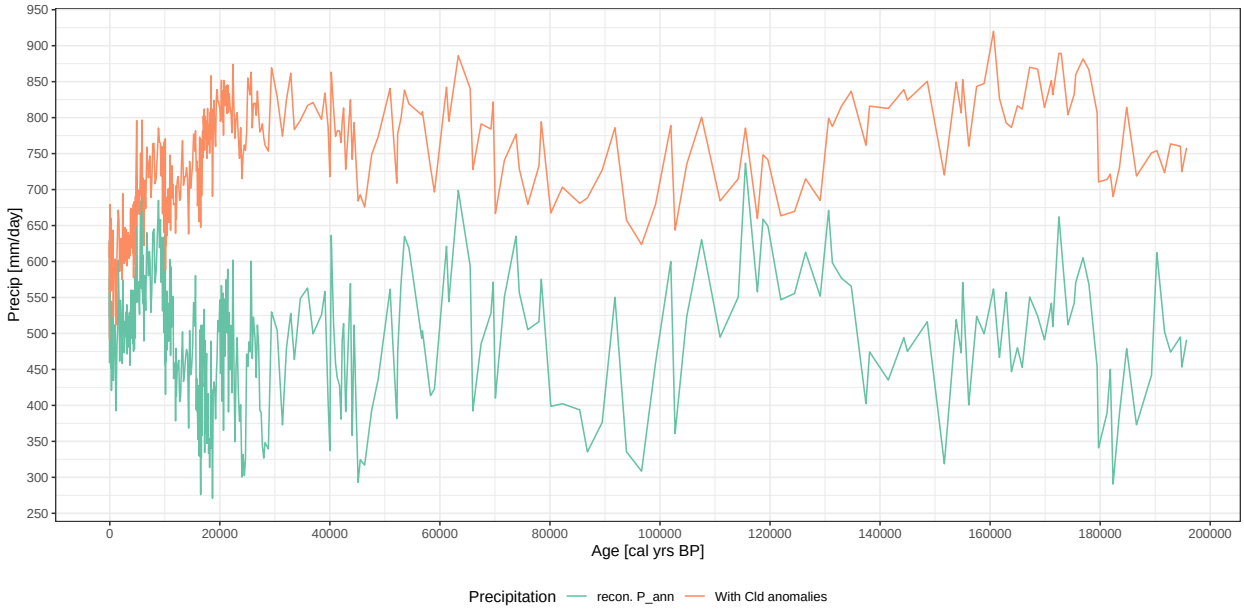
With temperature anomalies



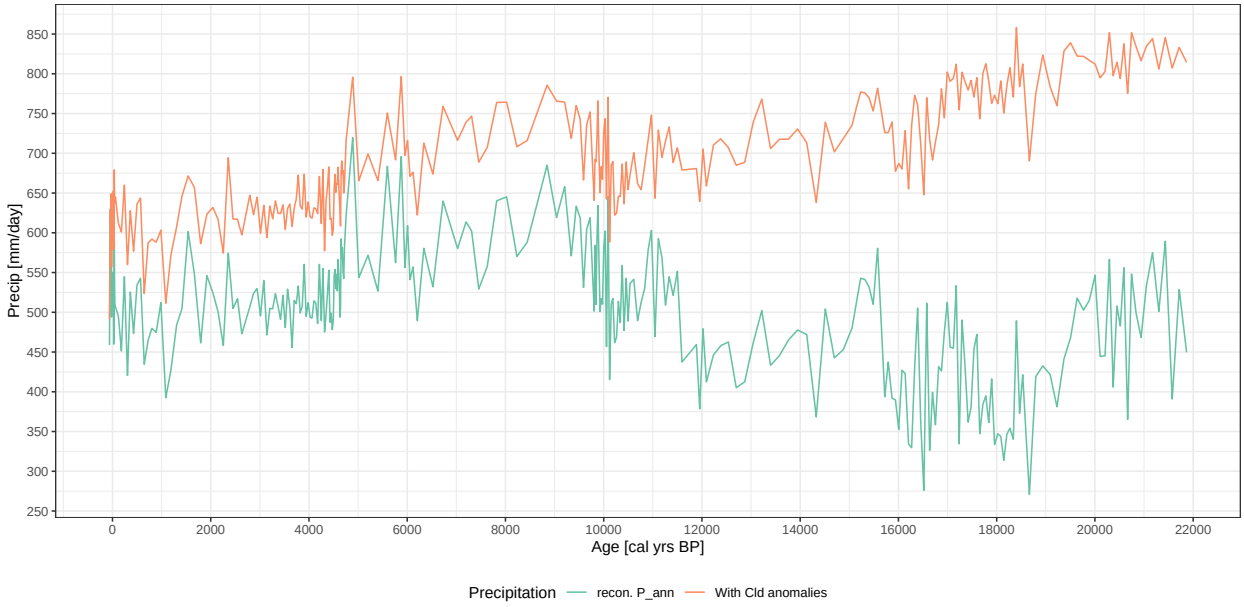
`age < 22k`



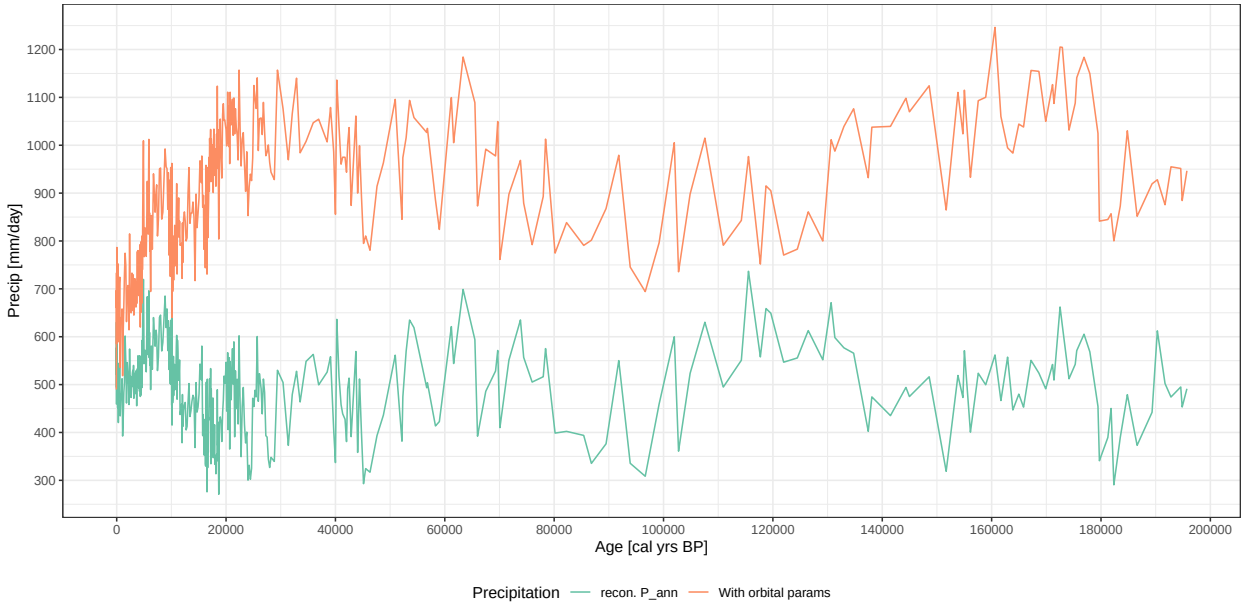
With cloud coverage anomalies



`age < 22k`

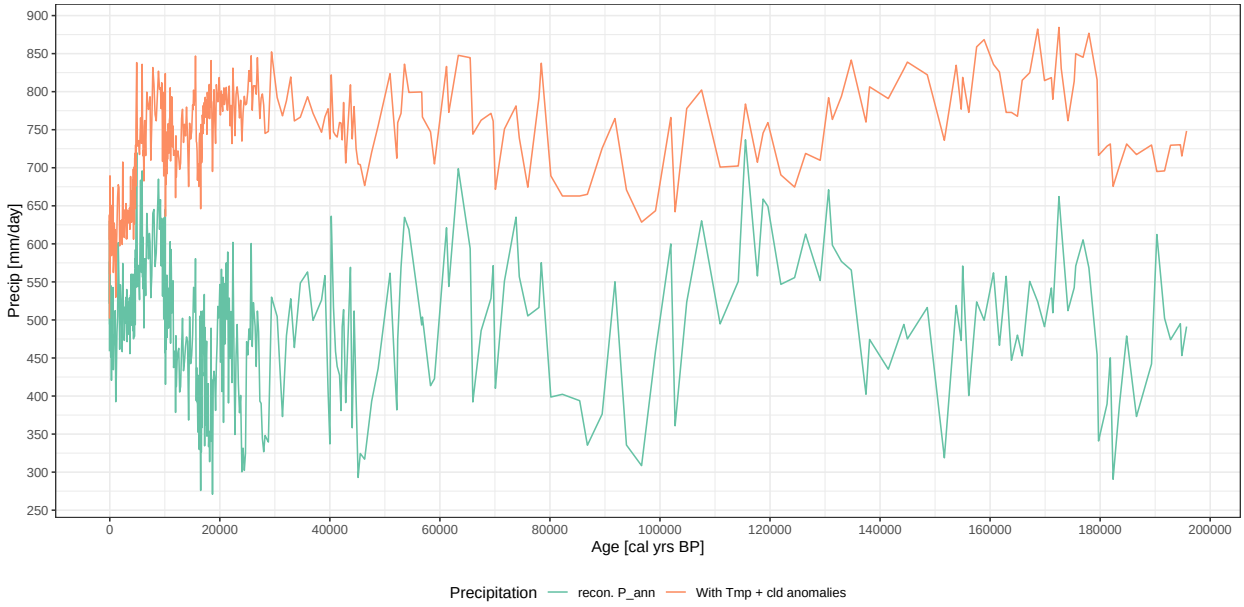


With orbital parameters

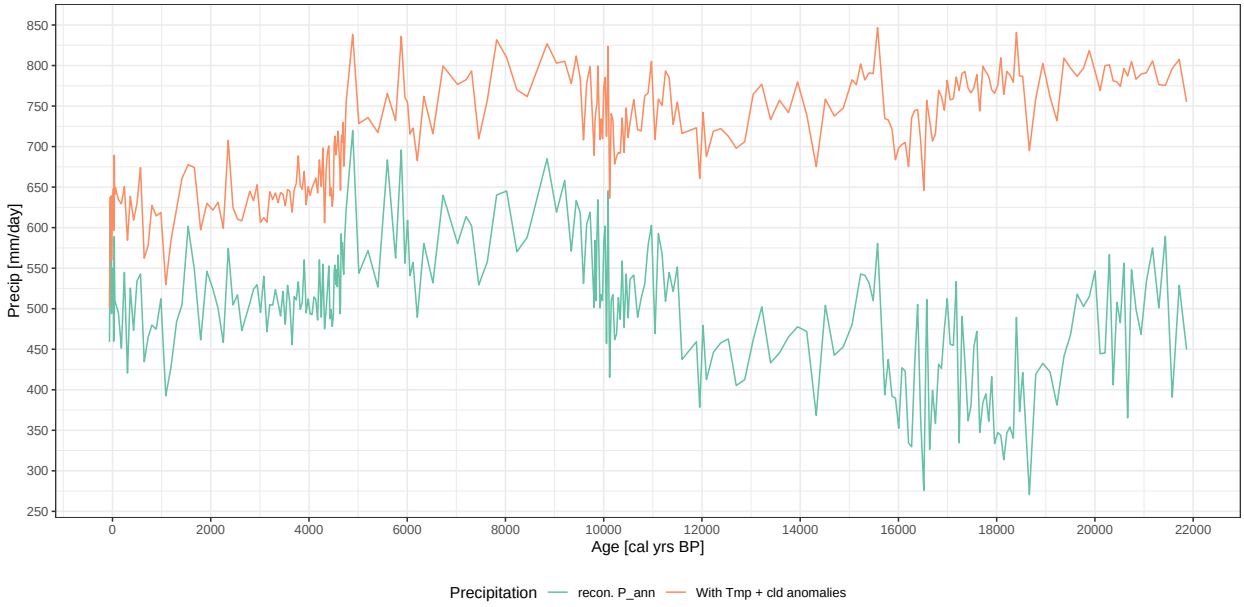


age < 22k

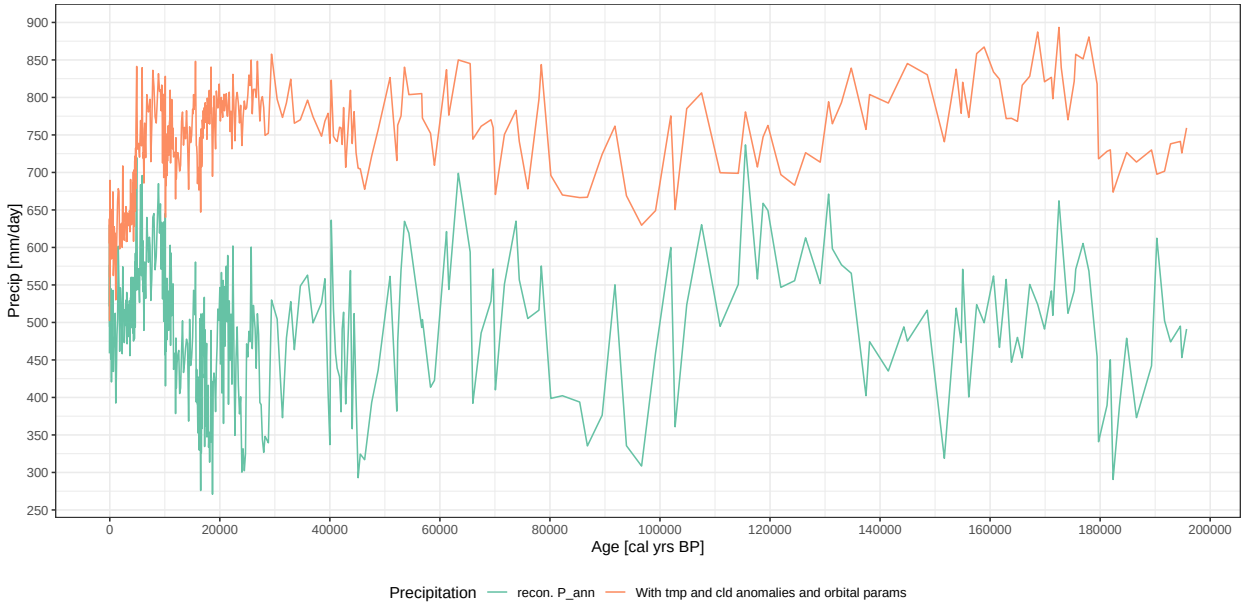
With temperature and cloud coverage anomalies



`age < 22k`

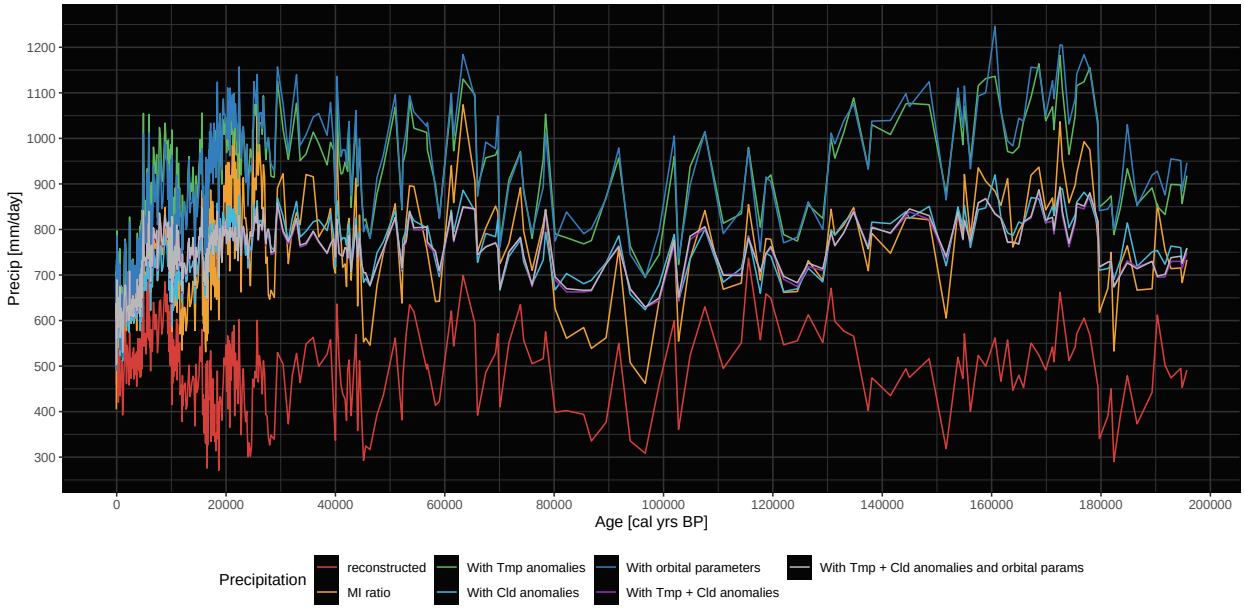


With temperature and cloud coverage anomalies and orbital parameters

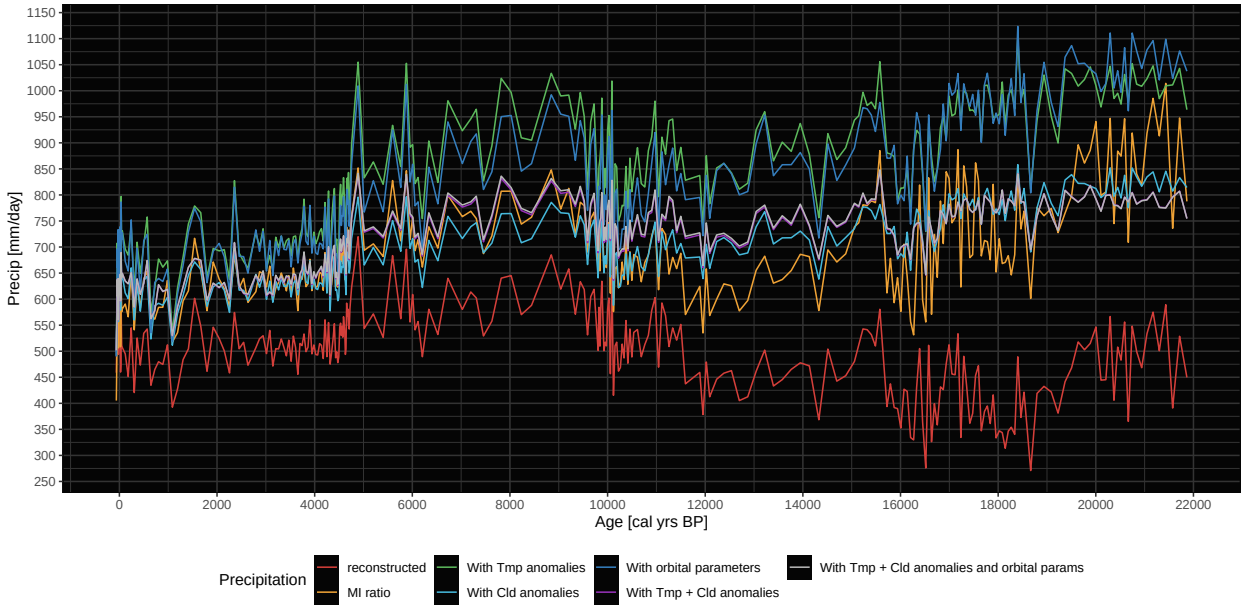


`age < 22k`

All the approaches



`age < 22k`



References

[1] Bereiter, B., Eggleston, S., Schmitt, J., Nehrbass-Ahles, C., Stocker, T. F., Fischer, H., Kipfstuhl, S., and Chappellaz, J. (2015), Revision of the EPICA Dome C CO2 record from 800 to 600 kyr before present, Geophys. Res. Lett., 42, 542– 549, doi:10.1002/2014GL061957.

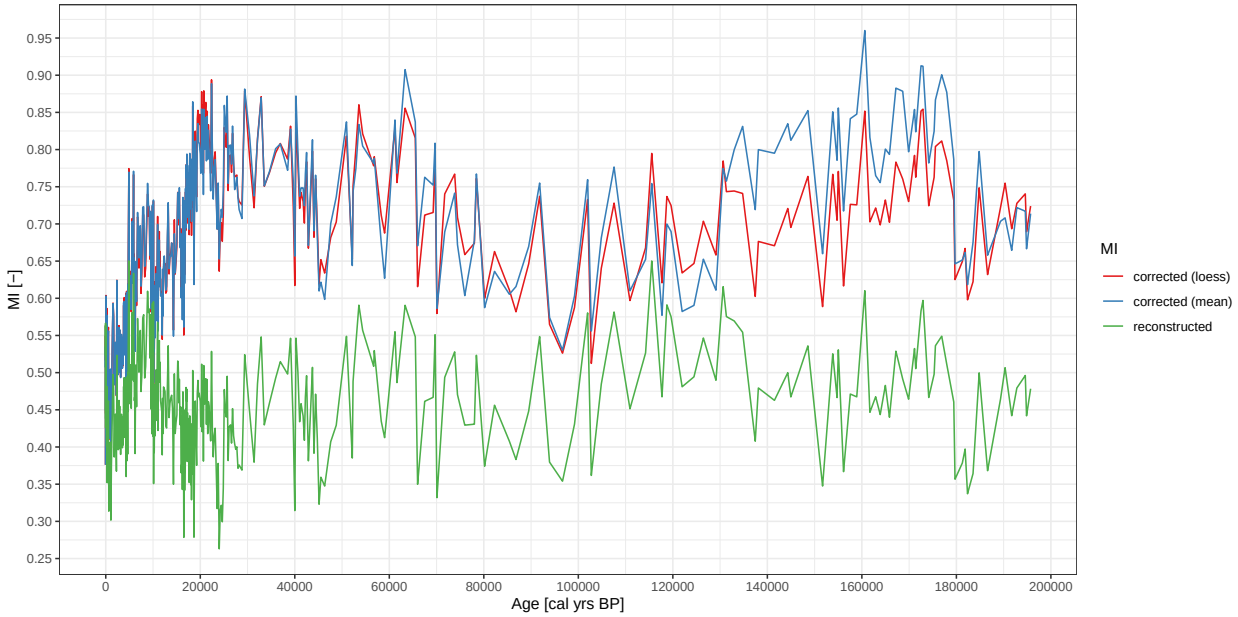
Appendix

A1. Find reconstructed MI using loess

```
past_co2_loess <- function(age_calBP, ref = codos::ice_core) {
  # Extract the reference age and co2
  ref_age <- purrr::pluck(ref, 1)
  ref_co2 <- purrr::pluck(ref, 2)
  if (age_calBP < min(ref_age))
    return(ref_co2[which.min(ref_age)])

  if (age_calBP > max(ref_age))
    return(ref_co2[which.max(ref_age)])
  loessMod10 <- loess(co2 ~ age_calBP,
                      tibble::tibble(age_calBP = ref_age,
                                     co2 = ref_co2), span = 0.1)
  return(predict(loessMod10, age_calBP))
}

padul2$past_co2_loess <- purrr::map_dbl(padul2$age_calBP,
                                        past_co2_loess)
padul2$corrected_mi_loess <- codos::corrected_mi(padul2$present_t,
                                                 padul2$past_temp,
                                                 padul2$recon_mi,
                                                 padul2$modern_co2,
                                                 padul2$past_co2_loess)

head(padul2, 10) %>%
  dplyr::select(-c(past_co2, corrected_mi, corrected_P_ann)) %>%
  knitr::kable() %>%
  kableExtra::kable_styling()
```

age_calBP	past_temp	modern_co2	present_t	recon_mi	past_co2_loess	corrected_mi_loess
-62	13.15918	332.1725	13.15918	0.425809	368.0200	0.3760617
-56	12.86272	332.1725	12.86272	0.471798	368.0200	0.4221282
-50	11.88472	332.1725	11.88472	0.506921	348.5771	0.4833120
-43	13.09339	332.1725	13.09339	0.566461	343.4588	0.5495868
-38	12.20387	332.1725	12.20387	0.528049	339.9523	0.5165080
-31	11.87980	332.1725	11.87980	0.522880	335.2524	0.5182767
-25	11.49567	332.1725	11.49567	0.562884	331.4182	0.5640199
-19	12.52563	332.1725	12.52563	0.438233	327.7633	0.4449942
-13	12.88969	332.1725	12.88969	0.468382	324.2577	0.4807442
-6	13.13016	332.1725	13.13016	0.483879	320.3318	0.5026841

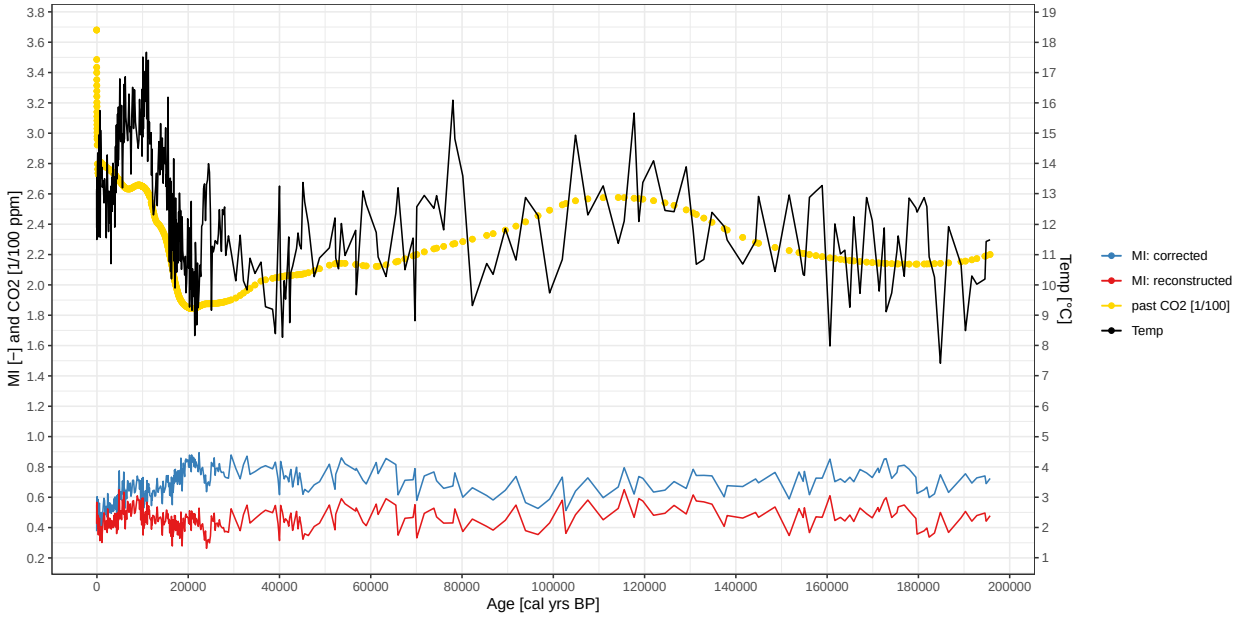
A2. Plot reconstructed vs corrected `MI` both approaches



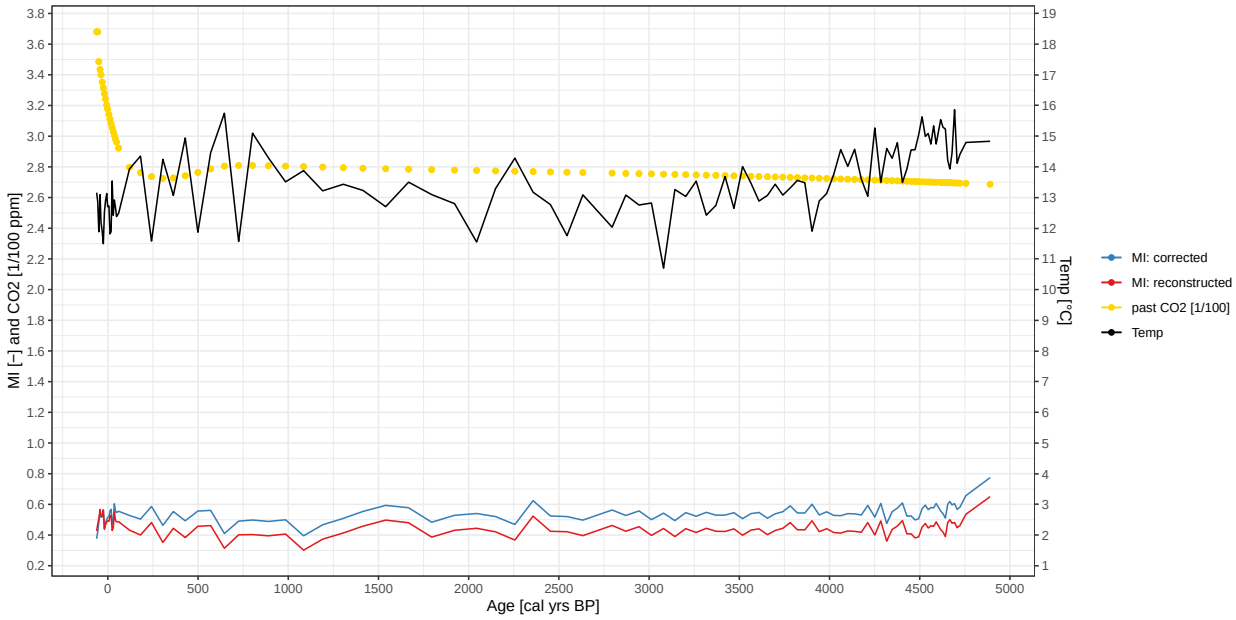
- `age < 5k`

A3. Reconstructed vs corrected MI: Past CO2 calculated using loess

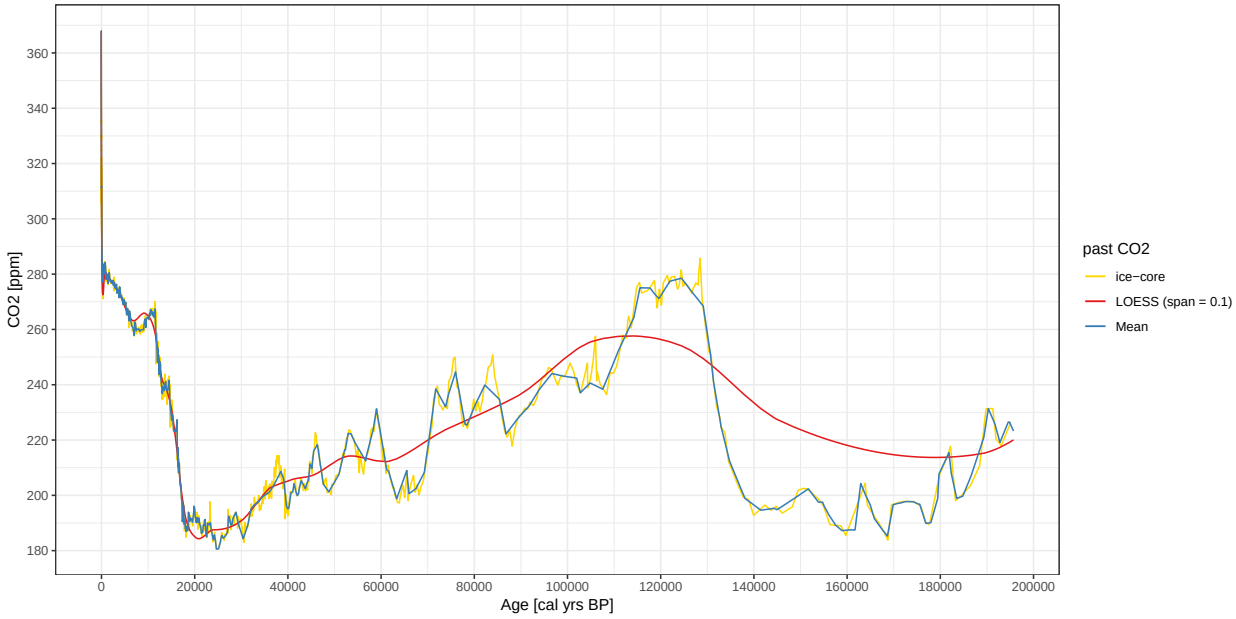
Include past CO2 and Temperature



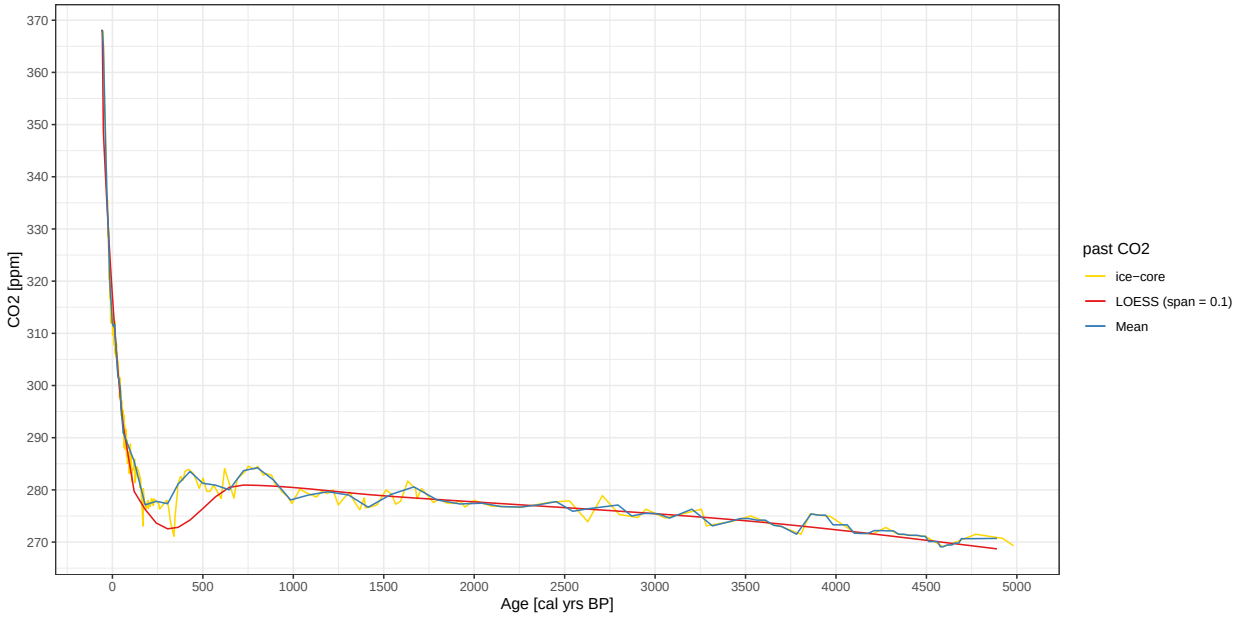
- age < 5k



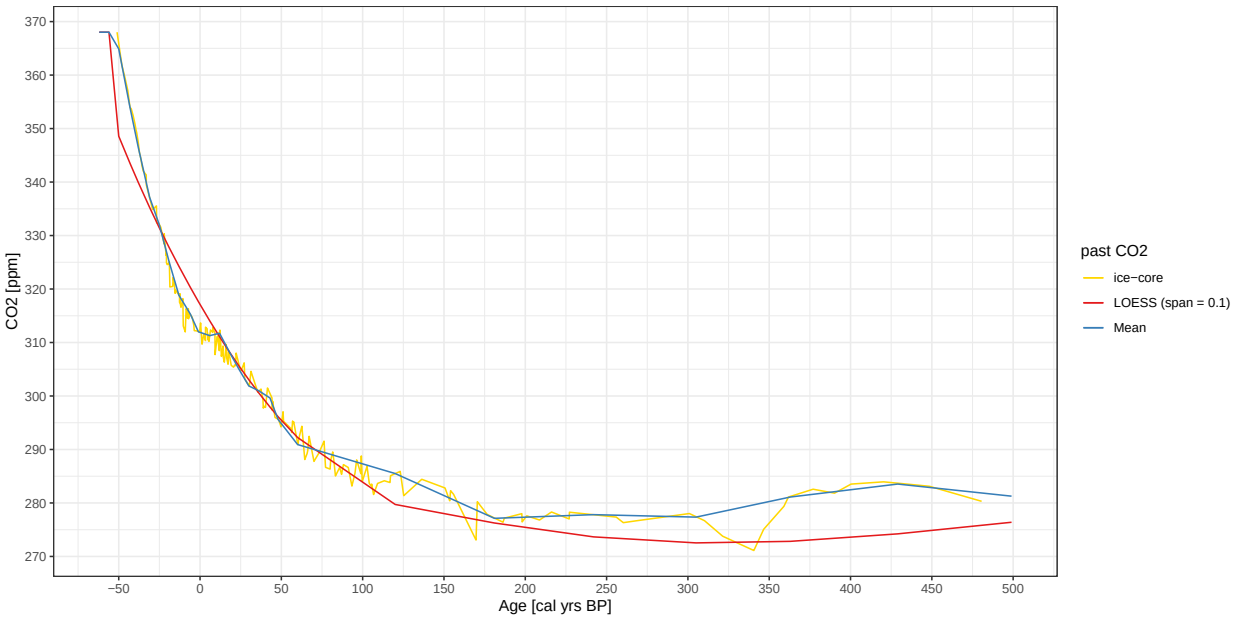
A4. Compare `codos::ice_core` vs past CO2 calculate using `mean` and `loess`



- `age < 5k`



- age < 500


CO2 [ppm]
370
360
350
340
330
320
310
300
290
280
270
−50
0
50
100
150
200
250
300
350
400
450
500
Age [cal yrs BP]
past CO2
ice−core
LOESS (span = 0.1)
Mean

A5. Padul Data

Download the CSV file: padul-with-corrected-mi.csv

age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corrected_mi	corrected_P_ann
-62	13.159180	368.020	332.1725	13.159180	0.425809	0.3760617	405.2045
-56	12.862720	368.020	332.1725	12.862720	0.471798	0.4221282	453.2860
-50	11.884725	364.900	332.1725	11.884725	0.506921	0.4618115	519.8011
-43	13.093390	353.835	332.1725	13.093390	0.566461	0.5349721	595.1792
-38	12.203865	346.520	332.1725	12.203865	0.528049	0.5071456	531.4777
-31	11.879800	337.155	332.1725	11.879800	0.522880	0.5154727	513.9939
-25	11.495670	331.960	332.1725	11.495670	0.562884	0.5632035	577.1264
-19	12.525630	325.080	332.1725	12.525630	0.438233	0.4491932	506.4780
-13	12.889695	318.840	332.1725	12.889695	0.468382	0.4895393	563.6869
-6	13.130160	315.340	332.1725	13.130160	0.483879	0.5110105	581.0153
-1	12.701260	312.000	332.1725	12.701260	0.493117	0.5257439	586.4524
6	12.724970	311.290	332.1725	12.724970	0.490124	0.5239778	559.4817
12	11.815300	311.730	332.1725	11.815300	0.524648	0.5573327	580.8138
18	11.888230	308.260	332.1725	11.888230	0.528909	0.5676032	579.8308
24	13.540305	304.970	332.1725	13.540305	0.429877	0.4752671	508.5630
30	12.423860	301.880	332.1725	12.423860	0.446556	0.4966866	526.5341
36	12.921615	301.000	332.1725	12.921615	0.550525	0.6030870	645.2069
43	12.653010	299.630	332.1725	12.653010	0.494339	0.5489721	595.4195
48	12.378860	295.610	332.1725	12.378860	0.486138	0.5479796	575.9491
60	12.490615	290.920	332.1725	12.490615	0.486739	0.5577028	581.0656
120	13.932820	285.500	332.1725	13.932820	0.432149	0.5156030	590.6057
181	14.350570	277.130	332.1725	14.350570	0.400314	0.5020553	566.0874
242	11.581430	277.815	332.1725	11.581430	0.481347	0.5774672	653.5468
305	14.247445	277.355	332.1725	14.247445	0.351935	0.4526353	541.0493
363	13.068665	281.110	332.1725	13.068665	0.444194	0.5355181	633.4196
429	14.941955	283.535	332.1725	14.941955	0.383781	0.4726243	582.9749
499	11.871105	281.270	332.1725	11.871105	0.457146	0.5463924	638.7152
570	14.464090	280.910	332.1725	14.464090	0.461804	0.5559743	653.4014
646	15.748480	280.005	332.1725	15.748480	0.313710	0.4111123	569.5985
725	11.569615	283.690	332.1725	11.569615	0.401503	0.4850699	561.4688
802	15.099470	284.240	332.1725	15.099470	0.403256	0.4909880	584.2360
890	14.293475	281.905	332.1725	14.293475	0.395018	0.4863217	584.4126

985	13.511010	278.075	332.1725	13.511010	0.406559	0.5047889	635.9665
1085	13.877625	279.020	332.1725	13.877625	0.301657	0.3977495	517.5607
1191	13.218835	279.640	332.1725	13.218835	0.373369	0.4675414	535.6874
1305	13.432900	279.020	332.1725	13.432900	0.413576	0.5097004	596.4063
1414	13.233040	276.675	332.1725	13.233040	0.458016	0.5591528	616.0464
1540	12.702920	279.130	332.1725	12.702920	0.497576	0.5928426	716.7344
1667	13.501385	280.575	332.1725	13.501385	0.480201	0.5735939	654.7091
1795	13.096470	278.070	332.1725	13.096470	0.386541	0.4839274	577.7743
1922	12.799950	277.300	332.1725	12.799950	0.431293	0.5301397	671.2958
2044	11.551290	277.450	332.1725	11.551290	0.444219	0.5407922	638.3754
2149	13.294700	276.800	332.1725	13.294700	0.421076	0.5217786	620.3435
2256	14.283885	276.700	332.1725	14.283885	0.367480	0.4697948	585.9190
2357	13.174110	277.150	332.1725	13.174110	0.523369	0.6238541	684.5434
2453	12.771775	277.750	332.1725	12.771775	0.424511	0.5223024	621.0451
2545	11.757505	275.900	332.1725	11.757505	0.421738	0.5217412	639.7428
2633	13.088010	276.400	332.1725	13.088010	0.396330	0.4973481	593.6856
2795	12.033940	277.100	332.1725	12.033940	0.462588	0.5608061	614.2271
2871	13.081115	275.000	332.1725	13.081115	0.424956	0.5292096	652.5057
2944	12.756910	275.500	332.1725	12.756910	0.454794	0.5576078	649.4476
3013	12.822585	275.450	332.1725	12.822585	0.397566	0.5001730	623.3310
3080	10.699305	274.600	332.1725	10.699305	0.443022	0.5441952	663.3557
3143	13.261510	275.450	332.1725	13.261510	0.390003	0.4933384	596.3871
3203	13.035830	276.300	332.1725	13.035830	0.441610	0.5430881	621.0408
3261	13.535495	274.700	332.1725	13.535495	0.416972	0.5226583	632.2447
3317	12.425060	273.100	332.1725	12.425060	0.444067	0.5514193	650.0985
3370	12.743310	273.550	332.1725	12.743310	0.424860	0.5316607	635.0597
3421	13.684420	274.000	332.1725	13.684420	0.423377	0.5309413	615.8640
3470	12.647450	274.500	332.1725	12.647450	0.440416	0.5450931	645.1247
3518	14.010410	274.500	332.1725	14.010410	0.399001	0.5058914	609.5964
3564	13.475130	274.200	332.1725	13.475130	0.432065	0.5388570	659.7374
3609	12.885270	274.200	332.1725	12.885270	0.440593	0.5463555	628.9141
3656	13.071425	273.200	332.1725	13.071425	0.402640	0.5106437	577.9745
3699	13.434470	273.000	332.1725	13.434470	0.430108	0.5394652	645.8900
3741	13.080005	272.250	332.1725	13.080005	0.444006	0.5544587	637.8762

3782	13.312910	271.500	332.1725	13.312910	0.481336	0.5942262	658.0875
3822	13.559430	273.450	332.1725	13.559430	0.434527	0.5431602	623.9230
3863	13.483015	275.400	332.1725	13.483015	0.433829	0.5380112	629.5600
3903	11.902960	275.150	332.1725	11.902960	0.493315	0.5956898	676.4864
3943	12.888460	275.150	332.1725	12.888460	0.422033	0.5255911	616.3606
3984	13.129820	273.300	332.1725	13.129820	0.441372	0.5495722	637.5467
4023	13.747505	273.300	332.1725	13.747505	0.416761	0.5259512	622.8486
4062	14.563010	273.300	332.1725	14.563010	0.412826	0.5236120	624.9831
4101	14.015225	271.700	332.1725	14.015225	0.426782	0.5401863	651.2493
4139	14.572930	271.650	332.1725	14.572930	0.424069	0.5387256	649.6216
4176	13.604615	271.650	332.1725	13.604615	0.418275	0.5308898	616.8235
4212	13.041955	272.200	332.1725	13.041955	0.481193	0.5919844	689.2192
4251	15.268020	272.200	332.1725	15.268020	0.400423	0.5151057	629.7976
4284	13.499280	272.150	332.1725	13.499280	0.491962	0.6038467	681.2346
4317	14.600530	272.150	332.1725	14.600530	0.360241	0.4732822	624.3093
4347	14.278675	271.500	332.1725	14.278675	0.436612	0.5510982	627.3208
4376	14.787685	271.500	332.1725	14.787685	0.458481	0.5742302	654.9839
4404	13.491295	271.300	332.1725	13.491295	0.494253	0.6080581	680.0208
4429	13.935795	271.300	332.1725	13.935795	0.407680	0.5216691	623.7687
4452	14.553305	271.300	332.1725	14.553305	0.407926	0.5232077	639.7772
4474	14.558790	271.100	332.1725	14.558790	0.381470	0.4969983	623.0231
4494	15.045370	271.100	332.1725	15.045370	0.388216	0.5048533	636.0253
4513	15.631435	270.100	332.1725	15.631435	0.451673	0.5725241	692.6979
4531	14.992585	270.100	332.1725	14.992585	0.475532	0.5951343	693.0565
4547	15.086240	270.100	332.1725	15.086240	0.446055	0.5656111	672.1560
4562	14.741750	270.100	332.1725	14.741750	0.460775	0.5796909	689.2154
4577	15.337330	269.100	332.1725	15.337330	0.456752	0.5793353	668.3883
4591	14.744645	269.100	332.1725	14.744645	0.486113	0.6075974	707.6977
4616	15.537315	269.450	332.1725	15.537315	0.435921	0.5579548	688.9853
4629	15.289300	269.450	332.1725	15.289300	0.418996	0.5403044	636.8883
4642	15.236480	269.450	332.1725	15.236480	0.390457	0.5113915	661.3813
4655	14.217500	269.800	332.1725	14.217500	0.481282	0.5999265	738.3099
4667	13.929305	269.800	332.1725	13.929305	0.500180	0.6183690	702.1538
4679	14.456340	269.800	332.1725	14.456340	0.477212	0.5963409	726.1829

4693	15.862295	270.650	332.1725	15.862295	0.481918	0.6022659	689.6305
4707	14.117130	270.650	332.1725	14.117130	0.448255	0.5644445	683.1358
4723	14.411470	270.650	332.1725	14.411470	0.462332	0.5792672	730.0178
4756	14.795020	270.650	332.1725	14.795020	0.535625	0.6540205	759.2267
4890	14.834370	270.700	332.1725	14.834370	0.650277	0.7696249	851.8166
5015	16.790890	268.950	332.1725	16.790890	0.458337	0.5848307	693.8061
5202	14.724575	269.800	332.1725	14.724575	0.510507	0.6305178	706.0863
5403	15.916575	265.300	332.1725	15.916575	0.451895	0.5850487	681.8191
5596	13.197670	267.600	332.1725	13.197670	0.580824	0.7032449	827.6529
5763	14.989795	265.700	332.1725	14.989795	0.490060	0.6202668	711.8867
5879	14.690215	263.100	332.1725	14.690215	0.633639	0.7708493	846.5621
5953	16.610490	263.700	332.1725	16.610490	0.488720	0.6281041	714.8000
6007	14.797680	266.700	332.1725	14.797680	0.526236	0.6539074	756.6379
6056	15.365505	266.100	332.1725	15.365505	0.462299	0.5921992	692.9861
6118	15.526410	265.500	332.1725	15.526410	0.467143	0.5989535	714.0853
6206	16.861230	264.350	332.1725	16.861230	0.391183	0.5286402	661.4317
6338	15.520625	262.700	332.1725	15.520625	0.510261	0.6494063	738.8449
6523	15.196245	261.150	332.1725	15.196245	0.454215	0.5957981	697.9002
6729	14.751830	260.750	332.1725	14.751830	0.572781	0.7153985	799.3482
7025	16.292160	257.850	332.1725	16.292160	0.500633	0.6543264	758.3491
7198	15.048425	262.650	332.1725	15.048425	0.548170	0.6865729	768.6718
7311	15.212085	261.850	332.1725	15.212085	0.556734	0.6976550	754.6420
7457	13.652665	259.550	332.1725	13.652665	0.474606	0.6163303	687.3658
7630	15.563800	260.100	332.1725	15.563800	0.496452	0.6421398	721.4430
7821	16.512985	260.050	332.1725	16.512985	0.573211	0.7225934	807.1561
8024	15.154520	260.200	332.1725	15.154520	0.577937	0.7230887	807.2214
8233	16.430325	259.300	332.1725	16.430325	0.492751	0.6429757	744.0353
8442	15.368730	259.800	332.1725	15.368730	0.507928	0.6539549	757.1605
8847	14.772840	259.950	332.1725	14.772840	0.609482	0.7545543	848.0871
9040	14.501085	259.850	332.1725	14.501085	0.580817	0.7251107	772.9406
9205	14.772915	262.850	332.1725	14.772915	0.585610	0.7231760	812.6367
9340	16.114460	263.750	332.1725	16.114460	0.519646	0.6578507	722.8843
9441	15.439775	262.900	332.1725	15.439775	0.577847	0.7169552	785.9178
9522	14.951680	260.750	332.1725	14.951680	0.548766	0.6916710	779.3402

9589	15.205050	263.800	332.1725	15.205050	0.450967	0.5859685	690.4487
9654	15.017930	263.800	332.1725	15.017930	0.546659	0.6821213	754.1668
9723	15.199465	263.800	332.1725	15.199465	0.569147	0.7052960	766.9717
9806	15.815015	264.400	332.1725	15.815015	0.417580	0.5523551	663.3367
9823	14.884225	264.400	332.1725	14.884225	0.487888	0.6209703	743.6489
9843	16.120400	264.400	332.1725	16.120400	0.480904	0.6171109	654.1886
9862	14.437820	264.400	332.1725	14.437820	0.524941	0.6572792	737.8494
9882	14.242735	264.400	332.1725	14.242735	0.593003	0.7255193	776.0656
9903	15.793380	264.300	332.1725	15.793380	0.493796	0.6295117	722.7842
9925	16.457260	264.300	332.1725	16.457260	0.428127	0.5649690	661.1291
9951	15.717115	264.300	332.1725	15.717115	0.473277	0.6085907	665.2183
9975	15.131305	264.300	332.1725	15.131305	0.453730	0.5873455	660.5562
10001	15.323460	264.200	332.1725	15.323460	0.532910	0.6680340	728.1785
10028	14.871245	264.100	332.1725	14.871245	0.558392	0.6928592	746.9772
10057	17.511240	264.100	332.1725	17.511240	0.414236	0.5544045	611.4569
10089	15.605590	264.100	332.1725	15.605590	0.595404	0.7321234	793.6120
10120	16.048725	264.000	332.1725	16.048725	0.350761	0.4864816	576.1342
10153	16.008700	263.700	332.1725	16.008700	0.473838	0.6114247	658.5502
10187	15.144115	263.700	332.1725	15.144115	0.481948	0.6173439	662.6134
10222	16.486195	264.550	332.1725	16.486195	0.392532	0.5284734	621.6832
10262	17.041910	264.550	332.1725	17.041910	0.394061	0.5315454	632.1417
10299	15.637060	265.700	332.1725	15.637060	0.427851	0.5590765	671.3084
10337	15.631225	265.300	332.1725	15.631225	0.426451	0.5586256	637.9596
10376	15.559980	264.900	332.1725	15.559980	0.479709	0.6131975	714.3981
10415	16.365245	266.200	332.1725	16.365245	0.414970	0.5467155	628.5075
10458	16.276965	266.200	332.1725	16.276965	0.484494	0.6166762	690.7941
10497	16.349345	266.200	332.1725	16.349345	0.438019	0.5699443	636.1695
10536	16.278340	267.200	332.1725	16.278340	0.464915	0.5944521	685.5593
10612	16.047825	267.200	332.1725	16.047825	0.503634	0.6329492	680.6308
10690	16.485350	266.450	332.1725	16.485350	0.448163	0.5799232	633.3784
10762	16.975485	266.000	332.1725	16.975485	0.435743	0.5698094	670.3551
10835	17.668380	265.550	332.1725	17.668380	0.473725	0.6112321	684.4006
10904	15.477845	266.350	332.1725	15.477845	0.524962	0.6551246	721.5590
10972	15.780770	266.200	332.1725	15.780770	0.567718	0.6994155	742.7306

11044	17.062450	266.200	332.1725	17.062450	0.422194	0.5558639	618.0762
11113	14.071460	264.800	332.1725	14.071460	0.541849	0.6725019	735.5572
11187	16.074465	265.150	332.1725	16.074465	0.490152	0.6244606	724.0019
11258	17.405490	264.400	332.1725	17.405490	0.513015	0.6531101	648.0763
11333	15.502385	264.455	332.1725	15.502385	0.543125	0.6781802	680.1243
11414	14.840655	266.320	332.1725	14.840655	0.487248	0.6155722	658.5961
11499	15.364930	267.415	332.1725	15.364930	0.513904	0.6411031	687.9523
11594	14.643270	261.000	332.1725	14.643270	0.462316	0.6028879	570.4168
11888	15.016305	253.730	332.1725	15.016305	0.445394	0.6054149	624.3483
11954	13.614930	251.455	332.1725	13.614930	0.389403	0.5505438	535.0964
12022	14.482675	248.130	332.1725	14.482675	0.465376	0.6389500	658.0110
12091	14.124780	253.345	332.1725	14.124780	0.417931	0.5759886	568.5271
12234	12.575605	249.090	332.1725	12.575605	0.480760	0.6461400	599.7654
12382	12.307820	243.655	332.1725	12.307820	0.477946	0.6569264	629.3173
12537	12.471630	248.330	332.1725	12.471630	0.474711	0.6417035	625.4916
12698	12.908245	242.915	332.1725	12.908245	0.428726	0.6109656	577.4721
12871	13.249050	240.295	332.1725	13.249050	0.425493	0.6160951	597.3181
13043	13.682535	236.770	332.1725	13.682535	0.483385	0.6864855	655.4606
13218	12.610745	239.410	332.1725	12.610745	0.536082	0.7285553	682.4635
13397	13.914370	237.830	332.1725	13.914370	0.439547	0.6397681	630.6274
13578	14.723270	239.845	332.1725	14.723270	0.458435	0.6560795	637.5664
13762	13.627845	241.110	332.1725	13.627845	0.466207	0.6563829	654.8638
13947	15.317390	238.245	332.1725	15.317390	0.469603	0.6744294	686.0825
14133	13.802605	237.820	332.1725	13.802605	0.450253	0.6502478	681.5591
14327	14.841775	238.940	332.1725	14.841775	0.349928	0.5490838	578.1488
14512	13.351390	241.600	332.1725	13.351390	0.498382	0.6866757	694.6188
14695	14.525705	233.200	332.1725	14.525705	0.418140	0.6342042	671.2518
14877	13.996235	230.035	332.1725	13.996235	0.433336	0.6571841	686.9437
15056	15.177935	227.185	332.1725	15.177935	0.443005	0.6812767	738.6479
15144	13.245490	229.240	332.1725	13.245490	0.489104	0.7132319	746.4827
15231	13.647995	229.225	332.1725	13.647995	0.515634	0.7418986	781.0428
15317	12.467560	227.640	332.1725	12.467560	0.513872	0.7402147	779.6719
15402	13.452520	225.065	332.1725	13.452520	0.492902	0.7311028	788.7972
15486	14.472345	223.400	332.1725	14.472345	0.459350	0.7070202	785.1056

15576	16.186575	223.145	332.1725	16.186575	0.491031	0.7486912	885.0770
15722	12.524460	223.510	332.1725	12.524460	0.429873	0.6679559	611.9009
15793	12.398135	223.610	332.1725	12.398135	0.430739	0.6679888	678.2288
15870	10.760215	222.935	332.1725	10.760215	0.453890	0.6870681	593.1834
15939	12.350730	223.770	332.1725	12.350730	0.365376	0.6007875	641.0728
16006	12.724970	223.400	332.1725	12.724970	0.375637	0.6139705	576.3481
16072	13.518925	224.360	332.1725	13.518925	0.366020	0.6045566	705.5121
16137	10.445880	223.635	332.1725	10.445880	0.441893	0.6715158	642.6793
16206	13.415415	227.320	332.1725	13.415415	0.342865	0.5712179	556.9302
16269	11.893750	216.390	332.1725	11.893750	0.422392	0.6807562	531.3674
16330	10.199119	213.515	332.1725	10.199119	0.474221	0.7357131	667.9085
16391	11.017990	210.360	332.1725	11.017990	0.442874	0.7181044	818.9822
16452	11.550620	217.190	332.1725	11.550620	0.395824	0.6495223	598.4974
16517	11.802705	208.300	332.1725	11.802705	0.278469	0.5612850	556.0948
16576	11.148750	208.555	332.1725	11.148750	0.448982	0.7312615	832.8555
16635	12.849935	210.805	332.1725	12.849935	0.375400	0.6566355	570.8671
16694	13.012700	211.700	332.1725	13.012700	0.341791	0.6199975	724.1482
16753	12.077215	207.890	332.1725	12.077215	0.363719	0.6511704	641.8751
16818	14.158905	205.360	332.1725	14.158905	0.373298	0.6817840	788.2620
16876	10.790900	204.060	332.1725	10.790900	0.451034	0.7477183	706.6831
16935	12.048430	203.625	332.1725	12.048430	0.390956	0.6944550	844.5665
16994	10.837725	203.625	332.1725	10.837725	0.480079	0.7792263	831.5005
17053	10.031810	203.210	332.1725	10.031810	0.465448	0.7617927	746.5405
17118	9.895848	200.365	332.1725	9.895848	0.461283	0.7673091	756.5534
17177	10.426055	198.460	332.1725	10.426055	0.477632	0.7939384	886.7711
17236	12.864705	198.290	332.1725	12.864705	0.380516	0.7090082	623.3233
17295	11.274705	195.265	332.1725	11.274705	0.446154	0.7788830	855.8157
17354	12.146745	190.500	332.1725	12.146745	0.404584	0.7611794	815.4687
17419	11.463015	191.325	332.1725	11.463015	0.396909	0.7455457	679.4962
17478	10.420725	192.240	332.1725	10.420725	0.424005	0.7634091	685.2200
17537	12.035565	192.495	332.1725	12.035565	0.385468	0.7325094	861.6090
17596	11.631775	196.375	332.1725	11.631775	0.438248	0.7684353	827.7905
17655	11.983090	193.795	332.1725	11.983090	0.352284	0.6928218	682.9590
17720	11.907815	189.965	332.1725	11.907815	0.419211	0.7769202	712.5554

17779	10.722560	189.475	332.1725	10.722560	0.441874	0.7948537	710.2874
17838	11.743250	190.365	332.1725	11.743250	0.407721	0.7623913	675.4323
17898	12.404180	190.990	332.1725	12.404180	0.365678	0.7208479	820.3435
17957	11.455935	188.600	332.1725	11.455935	0.376603	0.7360965	652.0481
18023	12.783990	187.790	332.1725	12.783990	0.349292	0.7203474	715.9588
18084	13.026125	188.615	332.1725	13.026125	0.392178	0.7624622	668.3156
18145	12.796495	186.945	332.1725	12.796495	0.328991	0.7032965	670.6126
18207	12.380540	187.265	332.1725	12.380540	0.382299	0.7537905	683.3721
18269	10.786970	188.775	332.1725	10.786970	0.431274	0.7873002	646.4666
18339	12.451600	187.925	332.1725	12.451600	0.363905	0.7324930	685.1383
18402	11.038440	188.340	332.1725	11.038440	0.502894	0.8642041	840.6750
18466	12.180700	187.270	332.1725	12.180700	0.381802	0.7519038	734.6463
18530	10.514090	187.670	332.1725	10.514090	0.435265	0.7943853	768.9658
18666	12.243875	193.900	332.1725	12.243875	0.278691	0.6185476	601.3267
18796	11.128360	192.970	332.1725	11.128360	0.398897	0.7388309	776.1414
18939	10.852120	190.605	332.1725	10.852120	0.461861	0.8114391	760.0220
19087	10.722190	191.900	332.1725	10.722190	0.409936	0.7521075	773.9294
19227	10.324510	191.335	332.1725	10.324510	0.375349	0.7166364	727.6624
19370	10.942980	191.550	332.1725	10.942980	0.472478	0.8189690	765.0047
19504	9.740445	190.235	332.1725	9.740445	0.489560	0.8348728	798.1736
19639	10.050925	191.420	332.1725	10.050925	0.467545	0.8092467	896.2856
19768	10.674020	193.600	332.1725	10.674020	0.472280	0.8088598	861.0226
19886	12.180290	196.060	332.1725	12.180290	0.465912	0.8012850	885.7282
20003	10.977170	194.890	332.1725	10.977170	0.461431	0.7943175	940.7486
20106	10.556615	192.095	332.1725	10.556615	0.427358	0.7682141	799.0032
20206	11.882545	192.095	332.1725	11.882545	0.431126	0.7800405	805.6983
20295	9.269087	190.230	332.1725	9.269087	0.511353	0.8545938	946.9566
20372	11.081285	190.230	332.1725	11.081285	0.420676	0.7721377	745.0939
20448	10.071010	191.960	332.1725	10.071010	0.458223	0.7976231	884.1910
20517	10.921845	191.960	332.1725	10.921845	0.423512	0.7669553	874.4147
20590	9.857285	190.845	332.1725	9.857285	0.489315	0.8327995	946.3770
20666	12.753365	190.845	332.1725	12.753365	0.381058	0.7395412	709.0150
20745	9.532400	190.210	332.1725	9.532400	0.509561	0.8543069	918.9197
20837	9.162833	191.765	332.1725	9.162833	0.491845	0.8278515	840.3692

20940	10.531110	191.765	332.1725	10.531110	0.457853	0.8006685	819.0635
21048	9.612870	189.635	332.1725	9.612870	0.481180	0.8280077	918.0409
21173	10.006380	189.225	332.1725	10.006380	0.491841	0.8428966	985.4282
21301	10.426695	188.645	332.1725	10.426695	0.430404	0.7847688	913.3883
21433	8.329884	186.235	332.1725	8.329884	0.490850	0.8447341	1014.1714
21574	11.400080	186.595	332.1725	11.400080	0.417916	0.7867675	735.9242
21716	10.645230	186.595	332.1725	10.645230	0.460863	0.8260547	947.6786
21866	8.680892	189.370	332.1725	8.680892	0.455234	0.7973193	787.6390
22031	10.720585	189.080	332.1725	10.720585	0.430449	0.7847700	931.8429
22197	9.247492	191.270	332.1725	9.247492	0.408191	0.7445526	761.8791
22379	9.802635	187.020	332.1725	9.802635	0.528548	0.8885861	1011.9564
22560	10.650660	184.945	332.1725	10.650660	0.425217	0.7966070	867.0117
22748	10.275895	190.010	332.1725	10.275895	0.386687	0.7333789	662.7393
22952	11.933450	189.400	332.1725	11.933450	0.415948	0.7761399	846.0722
23152	12.001330	189.340	332.1725	12.001330	0.425240	0.7863751	913.5683
23368	13.181340	190.155	332.1725	13.181340	0.371450	0.7355348	824.1257
23577	13.330280	187.385	332.1725	13.330280	0.317124	0.6929263	826.0320
23788	12.119755	185.560	332.1725	12.119755	0.377940	0.7550471	800.7207
24012	13.303990	183.905	332.1725	13.303990	0.263031	0.6528187	745.5155
24226	13.457145	185.705	332.1725	13.457145	0.315264	0.6994780	735.4476
24450	13.995055	183.650	332.1725	13.995055	0.321666	0.7196200	676.3510
24662	13.712425	180.570	332.1725	13.712425	0.299384	0.7090387	769.4902
24871	12.357000	180.630	332.1725	12.357000	0.344610	0.7448985	1018.9942
25088	9.163590	180.690	332.1725	9.163590	0.477244	0.8594006	817.6105
25291	11.272245	181.675	332.1725	11.272245	0.449034	0.8397807	912.9633
25501	11.086455	183.020	332.1725	11.086455	0.440271	0.8234270	887.1828
25699	11.214125	184.960	332.1725	11.214125	0.495095	0.8719989	1057.5581
25896	11.459530	185.530	332.1725	11.459530	0.381754	0.7546511	919.3363
26104	11.427615	184.545	332.1725	11.427615	0.426935	0.8052104	985.8653
26412	11.348065	184.890	332.1725	11.348065	0.429776	0.8060729	922.0878
26614	11.676505	185.475	332.1725	11.676505	0.405258	0.7804897	845.2079
26829	12.480595	185.935	332.1725	12.480595	0.451586	0.8315725	942.1478
27049	11.751265	186.830	332.1725	11.751265	0.415035	0.7850928	915.3713
27274	11.103970	192.495	332.1725	11.103970	0.404285	0.7461395	725.9766

27506	12.480025	191.380	332.1725	12.480025	0.396843	0.7516723	739.2108
27733	12.317240	189.300	332.1725	12.317240	0.400278	0.7629943	656.2798
27974	12.569895	189.290	332.1725	12.569895	0.371344	0.7350135	646.7926
28219	10.972120	191.705	332.1725	10.972120	0.375762	0.7193347	666.4531
28821	11.616680	193.890	332.1725	11.616680	0.368870	0.7072251	650.9799
29398	11.096930	189.520	332.1725	11.096930	0.524119	0.8813429	891.1381
30419	10.134460	184.300	332.1725	10.134460	0.448462	0.8200313	922.4242
31388	11.638685	189.215	332.1725	11.638685	0.379583	0.7377079	724.9237
32106	10.132605	195.165	332.1725	10.132605	0.484969	0.8126265	803.0922
32889	9.834265	196.700	332.1725	9.834265	0.548047	0.8696343	837.5050
33545	10.880855	197.465	332.1725	10.880855	0.429742	0.7512064	810.6101
34631	10.377045	199.590	332.1725	10.377045	0.458898	0.7702255	920.6240
35945	10.751385	201.045	332.1725	10.751385	0.492588	0.8011536	915.8127
36937	9.278780	203.510	332.1725	9.278780	0.514820	0.8075686	783.4162
38485	9.198735	208.655	332.1725	9.198735	0.498090	0.7721291	815.5837
39103	8.392639	205.800	332.1725	8.392639	0.546192	0.8275578	845.8183
39681	11.449825	196.185	332.1725	11.449825	0.427039	0.7566553	718.4522
40002	13.257680	195.075	332.1725	13.257680	0.314463	0.6567972	704.0650
40253	9.932895	195.795	332.1725	9.932895	0.546388	0.8719728	1015.4286
40657	8.272382	200.975	332.1725	8.272382	0.500606	0.7975231	823.1038
41029	10.137130	201.250	332.1725	10.137130	0.433944	0.7372877	778.8343
41327	9.530069	204.190	332.1725	9.530069	0.458241	0.7485176	716.9951
41758	10.671990	201.120	332.1725	10.671990	0.441728	0.7484513	724.4048
42029	11.580640	199.890	332.1725	11.580640	0.409008	0.7244935	674.7170
42240	8.755353	200.395	332.1725	8.755353	0.467121	0.7676348	807.2194
42495	10.413640	202.865	332.1725	10.413640	0.495868	0.7960205	824.4457
42877	10.613855	205.305	332.1725	10.613855	0.381419	0.6712295	688.6852
43740	11.207270	202.435	332.1725	11.207270	0.507078	0.8131439	912.6497
44062	11.711450	204.310	332.1725	11.711450	0.391607	0.6907888	632.0305
44404	11.324645	205.525	332.1725	11.324645	0.471039	0.7655094	831.6173
44764	11.184635	211.365	332.1725	11.184635	0.411543	0.6834532	660.9008
45138	13.376115	209.720	332.1725	13.376115	0.323035	0.6098068	553.1066
45525	12.733005	216.005	332.1725	12.733005	0.359366	0.6216854	561.3793
46322	12.018120	218.350	332.1725	12.018120	0.347459	0.5985030	545.9698

47601	10.271700	204.025	332.1725	10.271700	0.407037	0.7003318	676.7808
48772	10.887380	201.280	332.1725	10.887380	0.429229	0.7361912	748.1715
50937	11.221780	207.525	332.1725	11.221780	0.548830	0.8372143	856.4274
52168	12.206855	216.450	332.1725	12.206855	0.385159	0.6440339	638.4072
52330	10.884445	216.450	332.1725	10.884445	0.488210	0.7431924	722.2869
52933	10.531495	222.435	332.1725	10.531495	0.539465	0.7747823	818.1887
53562	12.023970	222.200	332.1725	12.023970	0.590746	0.8337287	895.9493
54360	10.969175	219.165	332.1725	10.969175	0.556933	0.8046875	894.4318
56695	11.799285	212.440	332.1725	11.799285	0.508502	0.7815264	758.2298
56821	9.676870	214.070	332.1725	9.676870	0.529626	0.7881438	749.6909
58294	13.096980	223.750	332.1725	13.096980	0.434754	0.6746082	641.7882
59004	12.654425	231.290	332.1725	12.654425	0.412567	0.6269247	642.2754
61201	11.728895	209.260	332.1725	11.728895	0.554980	0.8397901	939.8861
61618	10.919690	208.640	332.1725	10.919690	0.486621	0.7682840	858.8748
63345	10.277420	198.775	332.1725	10.277420	0.590586	0.9075171	1073.7844
65500	12.364315	208.980	332.1725	12.364315	0.548204	0.8370926	906.7943
65984	13.201235	200.590	332.1725	13.201235	0.349848	0.6705520	751.8007
67492	10.500190	202.450	332.1725	10.500190	0.461421	0.7627740	803.3129
69280	11.543625	208.340	332.1725	11.543625	0.466809	0.7521471	851.3213
69681	8.818884	213.405	332.1725	8.818884	0.550936	0.8085572	838.4127
70083	12.575910	217.940	332.1725	12.575910	0.331883	0.5864767	724.7715
71728	12.949905	238.510	332.1725	12.949905	0.493640	0.6892274	769.5446
73834	12.521990	232.035	332.1725	12.521990	0.527963	0.7414028	891.7791
74427	12.942090	236.285	332.1725	12.942090	0.470405	0.6720209	795.4949
75975	11.813955	244.640	332.1725	11.813955	0.429378	0.6036005	710.2720
78001	16.088725	225.785	332.1725	16.088725	0.430684	0.6777595	812.6098
78428	14.814645	225.395	332.1725	14.814645	0.523328	0.7671655	843.2491
80167	13.590870	232.670	332.1725	13.590870	0.374170	0.5874030	625.9138
82264	9.319097	239.880	332.1725	9.319097	0.456190	0.6362034	561.0427
85406	10.705515	234.690	332.1725	10.705515	0.407783	0.6054022	584.7437
86807	10.347030	222.220	332.1725	10.347030	0.383166	0.6157559	538.9338
89490	11.854085	228.130	332.1725	11.854085	0.448199	0.6695792	562.1430
91816	10.817200	232.430	332.1725	10.817200	0.548471	0.7549779	757.3056
93907	12.882770	238.210	332.1725	12.882770	0.379700	0.5742786	507.6096

96656	12.281340	244.055	332.1725	12.281340	0.353974	0.5301814	462.0675
99188	9.735085	243.085	332.1725	9.735085	0.430647	0.6030892	642.8305
101967	10.836270	242.415	332.1725	10.836270	0.580318	0.7595482	785.1427
102747	11.904570	237.070	332.1725	11.904570	0.361761	0.5559779	554.7023
104861	14.935930	240.620	332.1725	14.935930	0.484685	0.6812477	735.8701
107565	12.305630	238.385	332.1725	12.305630	0.581557	0.7765410	841.6145
110928	13.266150	252.310	332.1725	13.266150	0.451387	0.6100443	668.7043
114230	11.368895	264.240	332.1725	11.368895	0.526497	0.6523330	682.3826
115535	12.103225	275.060	332.1725	12.103225	0.650182	0.7542732	854.6783
117705	15.665745	274.980	332.1725	15.665745	0.467457	0.5771380	688.7723
118737	12.090160	272.730	332.1725	12.090160	0.591169	0.6998808	780.0291
119619	13.376815	271.165	332.1725	13.376815	0.575280	0.6898327	778.5044
121968	14.092390	277.430	332.1725	14.092390	0.481000	0.5822064	661.8658
124468	12.453005	278.530	332.1725	12.453005	0.494356	0.5904618	663.6526
126463	12.412600	274.085	332.1725	12.412600	0.546565	0.6525409	731.6746
129122	13.892880	268.440	332.1725	13.892880	0.489728	0.6108960	688.3382
130648	11.791140	251.340	332.1725	11.791140	0.615587	0.7745759	844.3937
131332	10.680325	241.130	332.1725	10.680325	0.575380	0.7575418	787.6721
132984	10.841310	224.630	332.1725	10.841310	0.569515	0.7997270	810.0130
134767	12.392455	212.430	332.1725	12.392455	0.554306	0.8311543	848.0441
137439	11.926565	201.460	332.1725	11.926565	0.407824	0.7191971	709.5208
138097	11.480050	198.865	332.1725	11.480050	0.479383	0.7999067	791.4852
141499	10.685910	194.630	332.1725	10.685910	0.462746	0.7950443	747.6969
144323	11.442350	195.305	332.1725	11.442350	0.499911	0.8347706	825.0972
144967	12.916365	194.805	332.1725	12.916365	0.467325	0.8124427	825.9021
148580	10.440630	198.795	332.1725	10.440630	0.536004	0.8524596	821.1526
151686	12.964835	202.350	332.1725	12.964835	0.347492	0.6599351	605.4850
153838	11.242885	197.540	332.1725	11.242885	0.525301	0.8507515	840.6617
154746	10.348605	197.540	332.1725	10.348605	0.466467	0.7856273	796.6841
155018	10.313355	196.300	332.1725	10.313355	0.530626	0.8559171	920.7836
156122	12.884660	192.840	332.1725	12.884660	0.366830	0.7173702	783.5005
157554	13.089500	189.190	332.1725	13.089500	0.471197	0.8415403	935.4016
158915	13.276425	187.250	332.1725	13.276425	0.467446	0.8476359	905.9255
160619	7.985918	187.500	332.1725	7.985918	0.610210	0.9600897	884.0940

161695	12.010360	187.500	332.1725	12.010360	0.446639	0.8163566	853.0346
162919	11.019520	204.300	332.1725	11.019520	0.467616	0.7649368	911.7094
163882	11.145145	200.400	332.1725	11.145145	0.443579	0.7555469	761.3108
164970	9.264389	196.500	332.1725	9.264389	0.482802	0.8006757	796.1350
165836	12.244175	191.600	332.1725	12.244175	0.440028	0.7935296	816.6090
167203	9.721515	188.400	332.1725	9.721515	0.528851	0.8826282	919.0699
168643	12.880855	185.250	332.1725	12.880855	0.491368	0.8784168	936.7654
169889	12.119125	196.600	332.1725	12.119125	0.464273	0.7970661	843.2481
171139	10.251235	197.200	332.1725	10.251235	0.532404	0.8539040	869.3412
171398	9.795615	197.200	332.1725	9.795615	0.505406	0.8238686	830.4705
172514	11.878105	197.750	332.1725	11.878105	0.582990	0.9126295	1036.4753
172930	9.116090	197.750	332.1725	9.116090	0.597110	0.9121336	952.0890
174149	9.733125	197.700	332.1725	9.733125	0.466567	0.7818955	858.3729
175288	11.109840	196.850	332.1725	11.109840	0.497959	0.8247202	898.2654
175565	11.614275	196.850	332.1725	11.614275	0.536219	0.8667833	922.8668
176896	10.283620	189.850	332.1725	10.283620	0.549047	0.9006094	992.8935
177960	12.862945	190.100	332.1725	12.862945	0.511227	0.8771065	975.2216
179446	12.538305	198.900	332.1725	12.538305	0.460554	0.7865898	775.9563
179707	12.398400	207.700	332.1725	12.398400	0.356645	0.6462810	617.8399
181254	12.878315	213.200	332.1725	12.878315	0.378381	0.6514011	670.5929
181849	12.580135	215.450	332.1725	12.580135	0.397286	0.6614986	749.5245
182354	10.924135	207.900	332.1725	10.924135	0.337109	0.6182913	533.0424
183523	10.255550	198.900	332.1725	10.255550	0.364258	0.6753821	722.3621
184818	7.416540	199.700	332.1725	7.416540	0.499713	0.7973629	764.1799
186603	11.920440	207.050	332.1725	11.920440	0.368120	0.6578863	666.7613
189340	10.674150	221.000	332.1725	10.674150	0.464490	0.7035537	669.7718
190307	8.493256	231.350	332.1725	8.493256	0.506649	0.7081428	855.7761
191709	10.294565	225.850	332.1725	10.294565	0.442095	0.6644589	754.8359
192795	10.022120	219.150	332.1725	10.022120	0.479334	0.7219279	713.9561
194581	10.191110	226.500	332.1725	10.191110	0.496187	0.7171165	715.4877
194846	11.431140	226.500	332.1725	11.431140	0.441957	0.6665682	683.5583
195710	11.487825	223.250	332.1725	11.487825	0.478354	0.7138342	733.1472