

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 %>%
  median()
```

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$corr_mi <- codos::corrected_mi(padul2$present_t,
                                       padul2$past_temp,
                                       padul2$recon_mi,
                                       padul2$modern_co2,
                                       padul2$past_co2)
```

age cal yr BP	past temp	past co2	modern co2	present temp	recon. MI	corr. MI	corr. MI (20th)
-62	13.15918	368.020	332.165	13.15918	0.425809	0.3760503	0.3431377
-56	12.86272	368.020	332.165	12.86272	0.471798	0.4221168	0.3892587
-50	11.88472	364.900	332.165	11.88472	0.506921	0.4618002	0.4293762
-43	13.09339	353.835	332.165	13.09339	0.566461	0.5349605	0.5017009
-38	12.20387	346.520	332.165	12.20387	0.528049	0.5071343	0.4744323

Check out and download the entire dataset in Appendix A5.

Find the corrected Annual Precipitation, P_{ann}

Approximated as the ratio

$$MI_{\text{ratio}} = \frac{\text{corrected}}{\text{reconstructed}}$$

multiplied by reconstructed P_{ann}.

```
mi_ratio <- padul2$corr_mi / padul2$recon_mi
padul2$corr_P_ann <- padul2$P_ann * mi_ratio
```

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

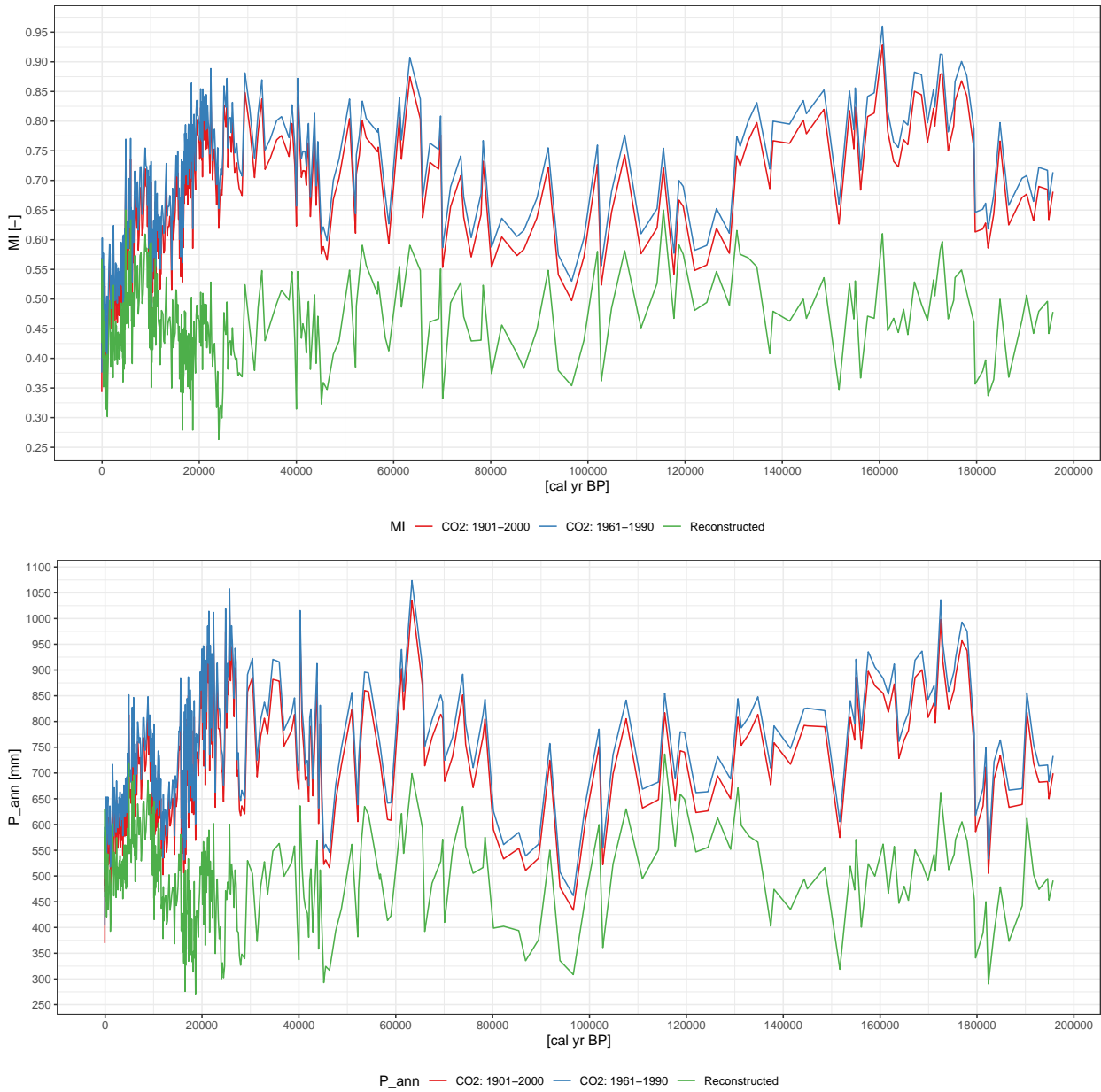
# Small subset
knitr::kable(head(padul2, 13),
              col.names = c("age cal yr BP",
                           "past temp",
                           "past co2",
                           "modern co2",
                           "present temp",
                           "recon. MI",
                           "corr. MI",
                           "corr. MI (20th)",
                           "corr. Pann",
                           "corr. Pann (20th)"))
```

age cal yr BP	past temp	past co2	modern co2	present temp	recon. MI	corr. MI	corr. MI (20th)	corr. Pann	corr. Pann (20th)
-62	13.15918	368.020	332.165	13.15918	0.425809	0.3760503	0.3431377	405.1922	369.7292
-56	12.86272	368.020	332.165	12.86272	0.471798	0.4221168	0.3892587	453.2738	417.9903
-50	11.88472	364.900	332.165	11.88472	0.506921	0.4618002	0.4293762	519.7884	483.2929
-43	13.09339	353.835	332.165	13.09339	0.566461	0.5349605	0.5017009	595.1664	558.1636
-38	12.20387	346.520	332.165	12.20387	0.528049	0.5071343	0.4744323	531.4658	497.1948
-31	11.87980	337.155	332.165	11.87980	0.522880	0.5154614	0.4829125	513.9827	481.5272
-25	11.49567	331.960	332.165	11.49567	0.562884	0.5631923	0.5307318	577.1149	543.8519
-19	12.52563	325.080	332.165	12.52563	0.438233	0.4491819	0.4164441	506.4652	469.5524
-13	12.88969	318.840	332.165	12.88969	0.468382	0.4895278	0.4564923	563.6737	525.6344
-6	13.13016	315.340	332.165	13.13016	0.483879	0.5109989	0.4777764	581.0022	543.2284
-1	12.70126	312.000	332.165	12.70126	0.493117	0.5257325	0.4927145	586.4396	549.6090
6	12.72497	311.290	332.165	12.72497	0.490124	0.5239663	0.4909395	559.4694	524.2047
12	11.81530	311.730	332.165	11.81530	0.524648	0.5573214	0.5247072	580.8020	546.8137

Check out and download the entire dataset in Appendix A5.

Comparison of modern CO2

Years	avg. CO2
1901 - 2000	311.765
1961 - 1990	332.165

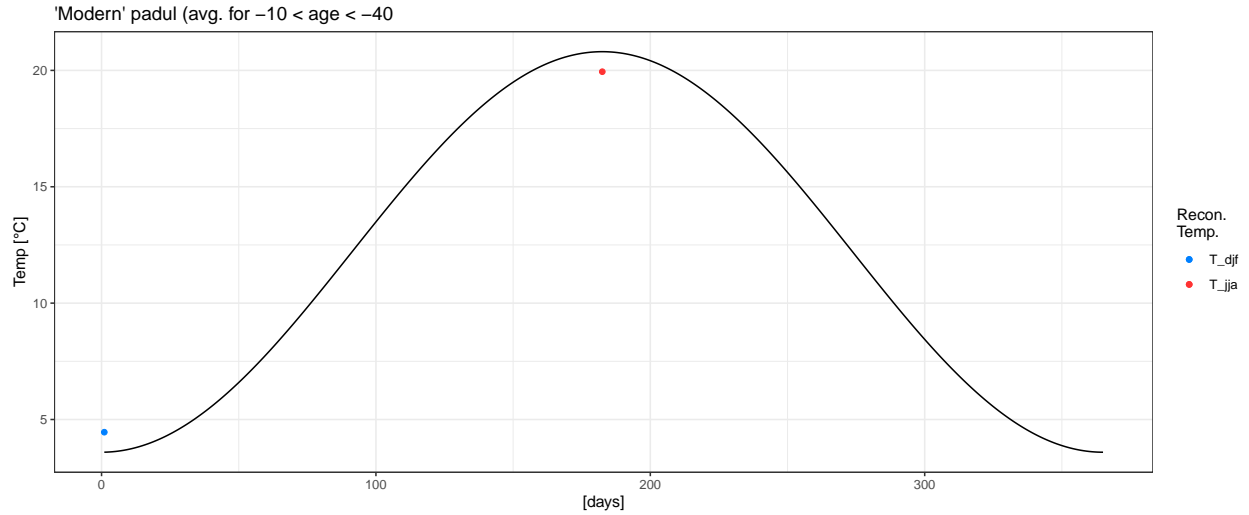


New corrections

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

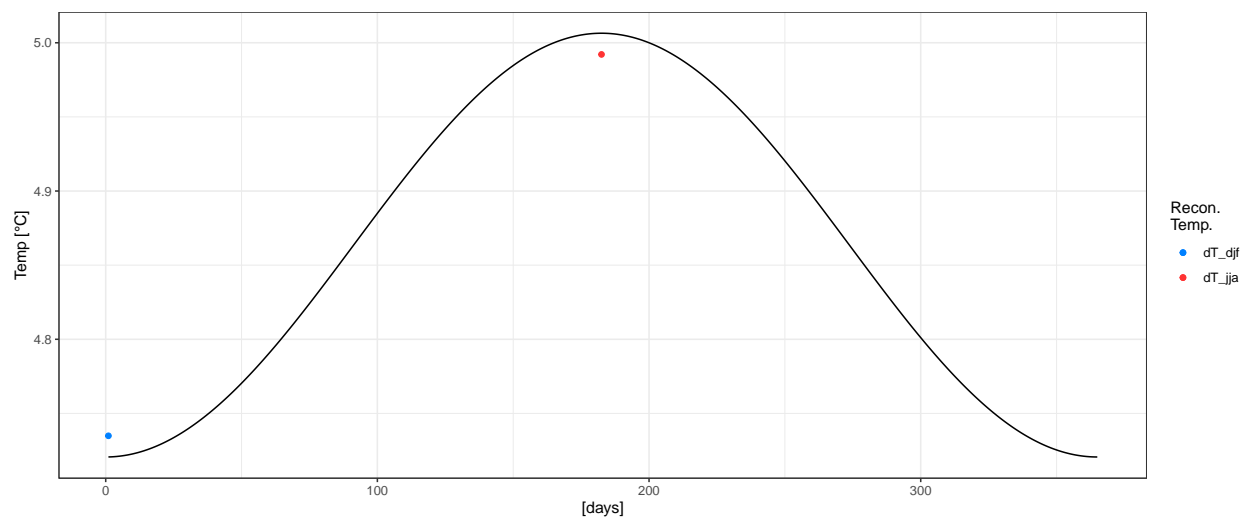
$$T_{\text{mean}} = (T_{jja} + T_{djf}) / 2$$

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

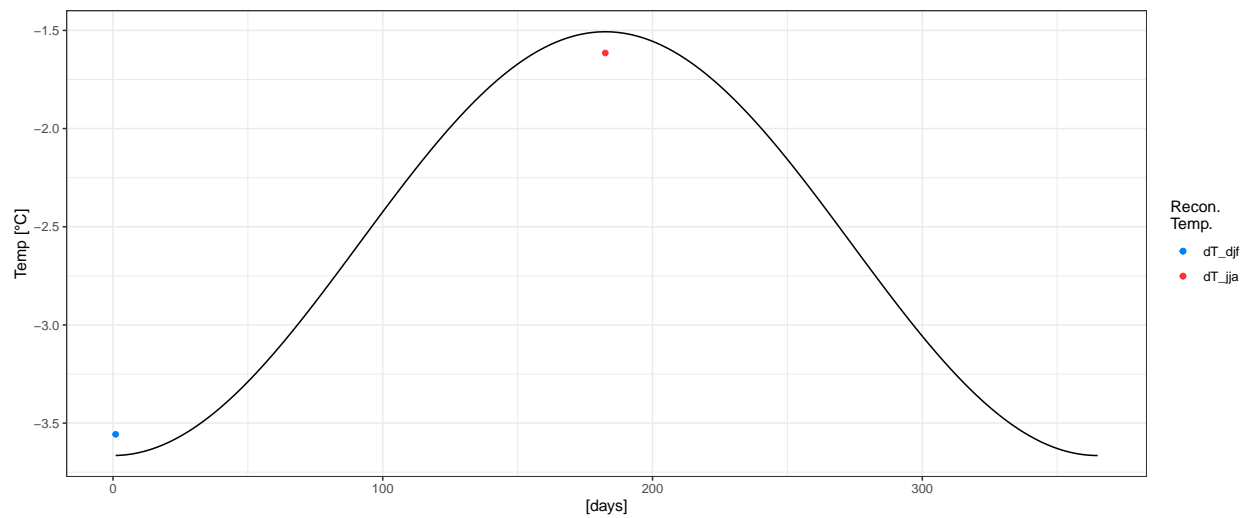
$$T_{\text{min}} = T_{\text{mean}} + (T_{djf} - T_{\text{mean}}) / 0.9$$

```
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

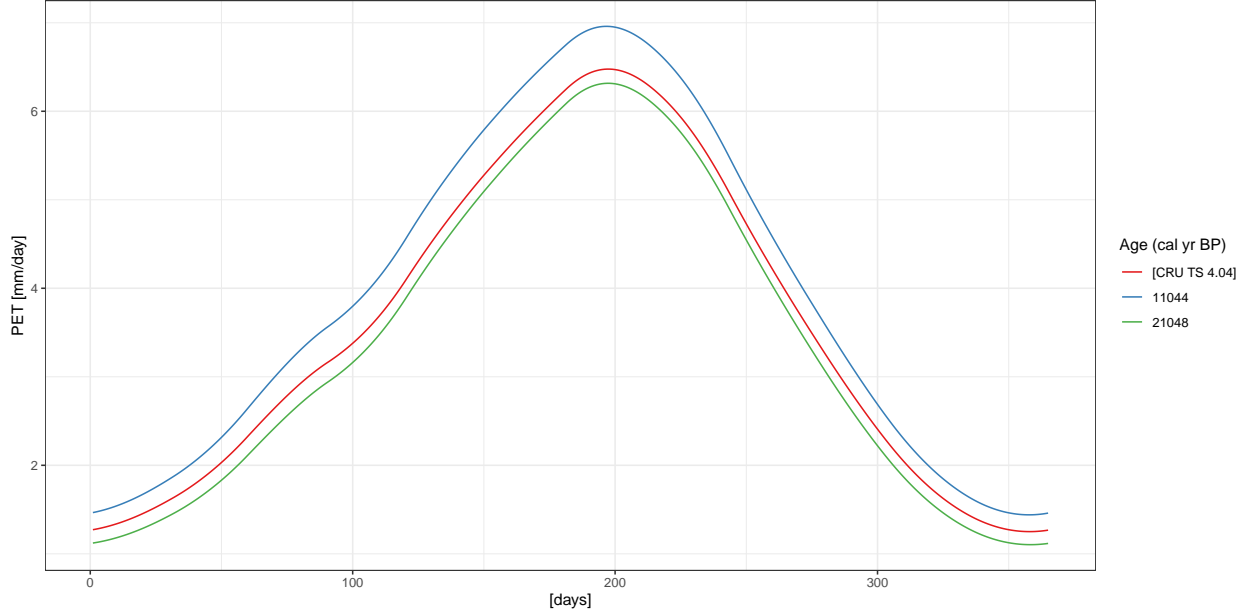


Calculate potential evapotranspiration (PET)

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).

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

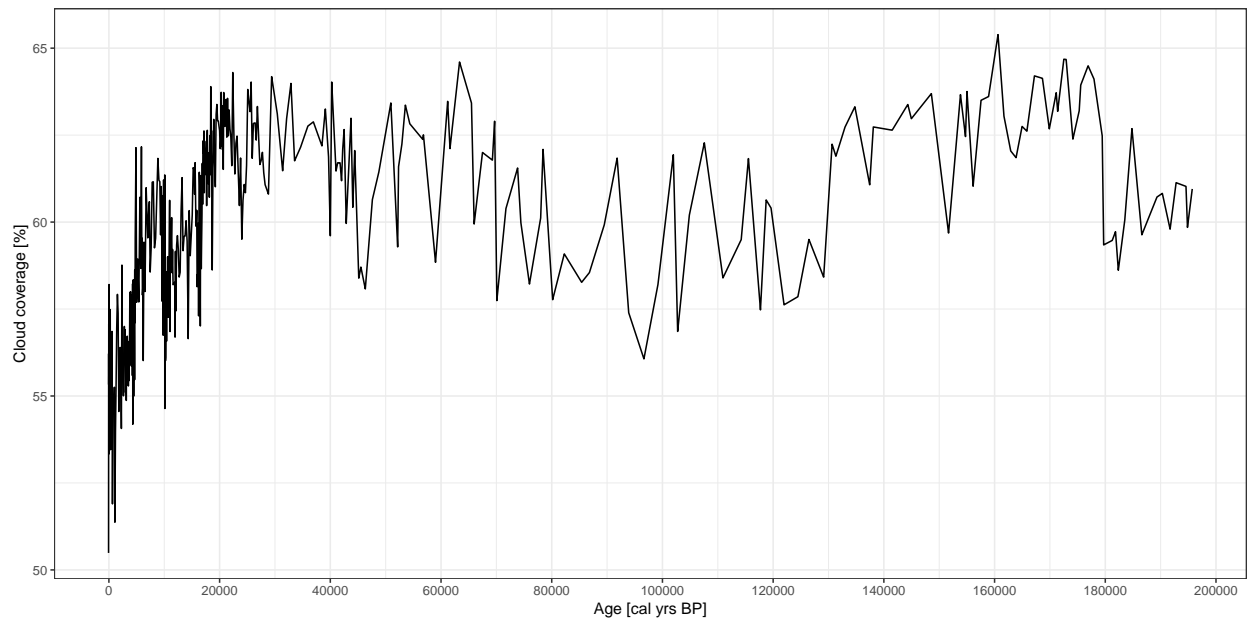
age_cal_yr_BP	MI	P_ann	corr_mi	corr_P_ann (MI ratio)	corr_P_ann (Tmp anomalies)
-62	0.425809	458.807	0.3760503	405.1922	499.9146
-56	0.471798	506.622	0.4221168	453.2738	557.1390
-50	0.506921	570.575	0.4618002	519.7884	596.7901
-43	0.566461	630.212	0.5349605	595.1664	707.7028
-38	0.528049	553.384	0.5071343	531.4658	660.5909
-31	0.522880	521.380	0.5154614	513.9827	667.2044
-25	0.562884	576.799	0.5631923	577.1149	722.1817
-19	0.438233	494.120	0.4491819	506.4652	588.2986

age_cal_yr_BP	MI	P_ann	corr_mi	corr_P_ann (MI ratio)	corr_P_ann (Tmp anomalies)
-13	0.468382	539.325	0.4895278	563.6737	646.8685
-6	0.483879	550.167	0.5109989	581.0022	678.2997
-1	0.493117	550.058	0.5257325	586.4396	691.8830
6	0.490124	523.334	0.5239663	559.4694	689.9857
12	0.524648	546.752	0.5573214	580.8020	720.9460
18	0.528909	540.303	0.5675918	579.8192	733.6961
24	0.429877	459.993	0.4752556	508.5506	637.3694
4679	0.477212	581.116	0.5963290	726.1685	812.2756
4693	0.481918	551.825	0.6022537	689.6166	843.0120
4707	0.448255	542.514	0.5644327	683.1216	763.6414
4723	0.462332	582.651	0.5792553	730.0029	787.7851
4756	0.535625	621.786	0.6540085	759.2128	896.3135
4890	0.650277	719.723	0.7696128	851.8032	1054.9465
11499	0.513904	551.458	0.6410910	687.9393	891.3019
11594	0.462316	437.416	0.6028760	570.4055	828.2088
11888	0.445394	459.323	0.6054028	624.3359	837.2940
11954	0.389403	378.477	0.5505321	535.0851	740.8392
12022	0.465376	479.259	0.6389381	657.9987	875.4683
12091	0.417931	412.517	0.5759768	568.5155	782.8518
21433	0.490850	589.305	0.8447231	1014.1582	1009.5023
21574	0.417916	390.909	0.7867560	735.9135	1011.1770
21716	0.460863	528.718	0.8260434	947.6656	1042.8897
21866	0.455234	449.707	0.7973083	787.6282	963.6708
22031	0.430449	511.119	0.7847587	931.8295	991.8708
22197	0.408191	417.690	0.7445416	761.8678	911.7025
184818	0.499713	478.917	0.7973521	764.1696	933.3177
186603	0.368120	373.086	0.6578749	666.7498	855.3995
189340	0.464490	442.187	0.7035425	669.7611	891.3955
190307	0.506649	612.275	0.7081319	855.7630	850.8067
191709	0.442095	502.227	0.6644477	754.8232	832.7711
192795	0.479334	474.041	0.7219167	713.9450	898.9505
194581	0.496187	495.060	0.7171053	715.4765	897.7241
194846	0.441957	453.222	0.6665568	683.5466	856.9878
195710	0.478354	491.296	0.7138228	733.1355	918.2233

Calculate cloud coverage from corrected MI

```
padul_cld_corr_mi <- padul2$corr_mi %>%  
  purrr::map_dbl(codos::cld)
```

Padul: cloud coverage

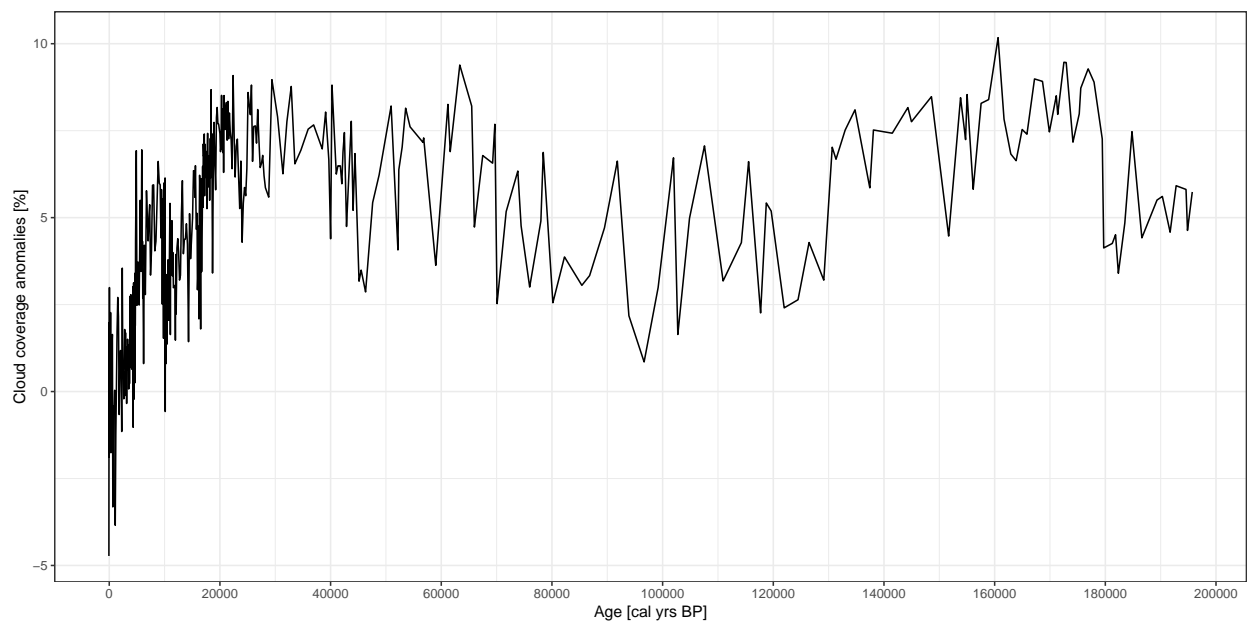


Calculate cloud coverage anomalies

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

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

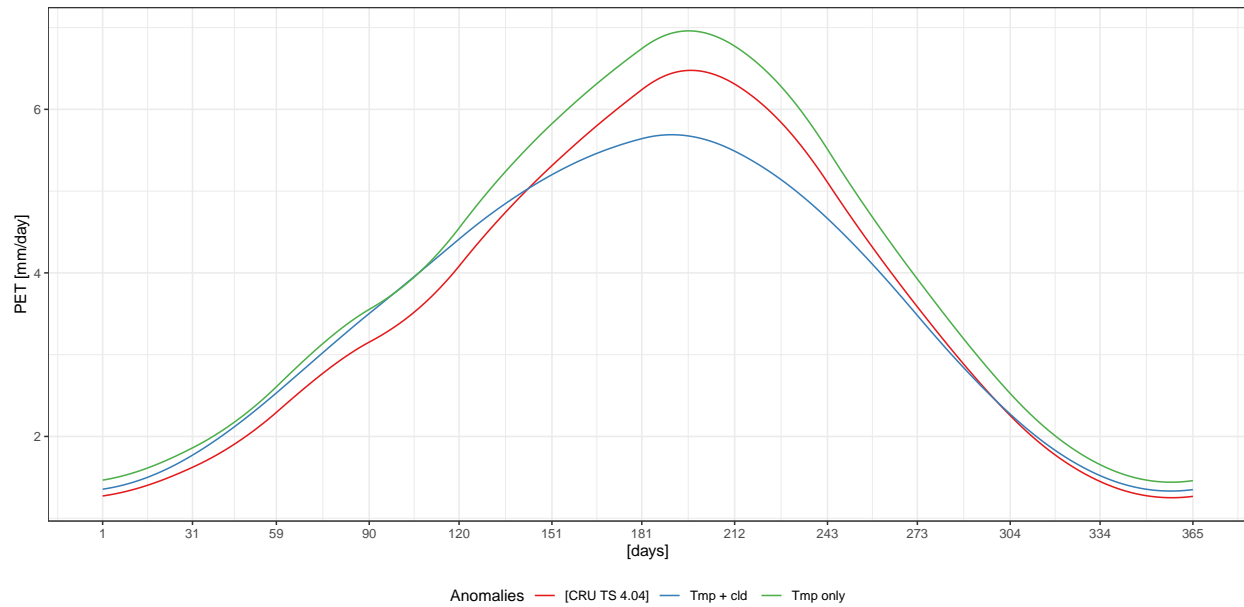
Padul: cloud coverage anomalies



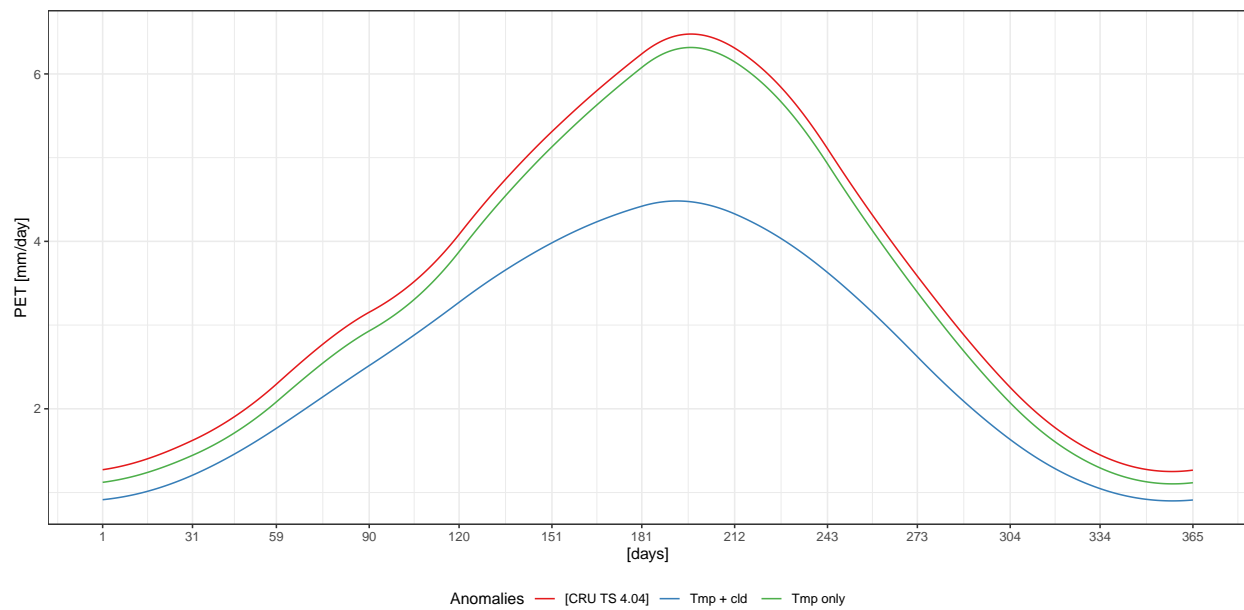
Re-calculate potential evapotranspiration (PET)

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$corr_m
```

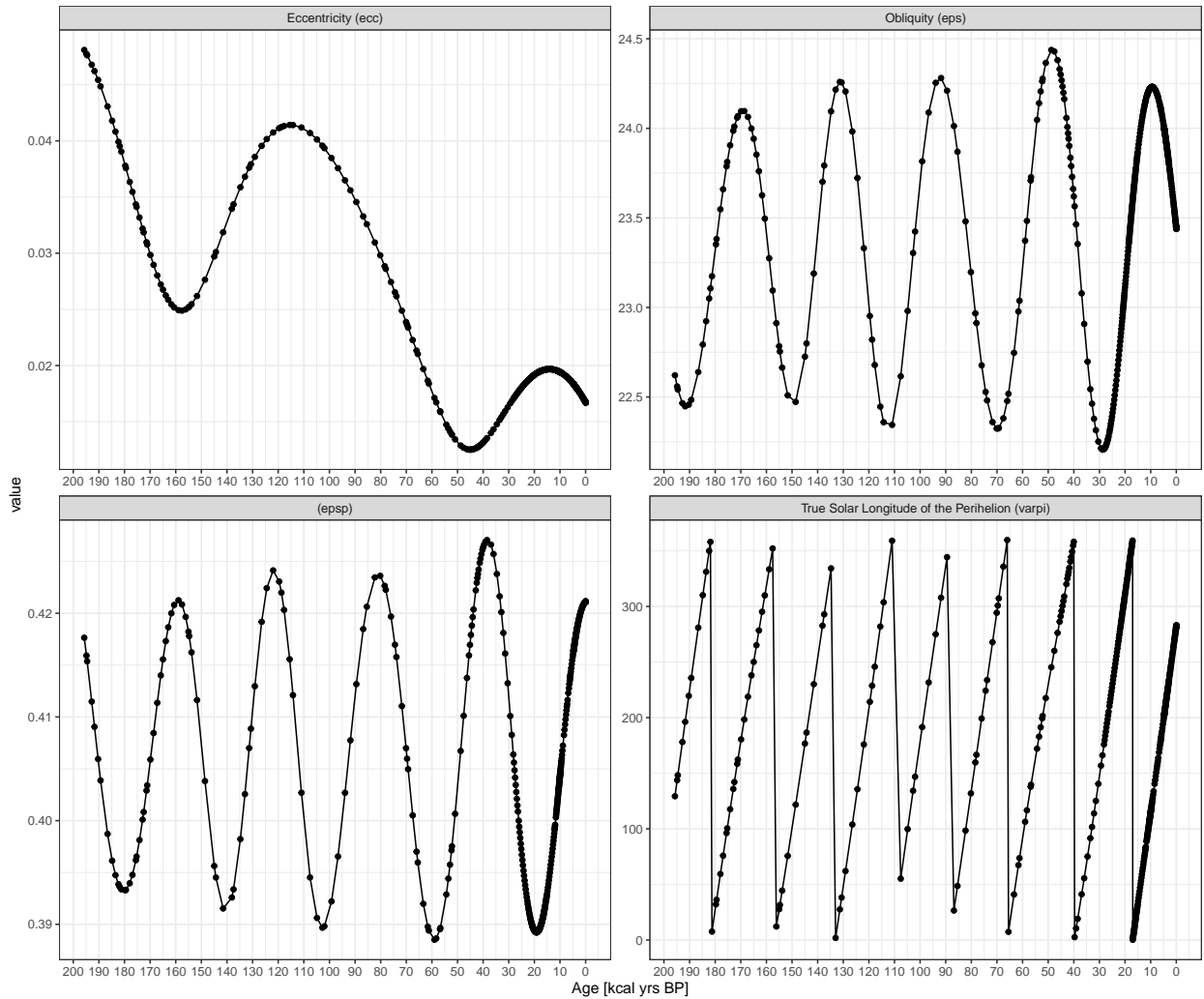
age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corr_mi	corr_mi_20th	corr_P_ann
-62	13.159180	368.020	332.165	13.159180	0.425809	0.3760503	0.3431377	501.7466
-56	12.862720	368.020	332.165	12.862720	0.471798	0.4221168	0.3892587	540.8083
-50	11.884725	364.900	332.165	11.884725	0.506921	0.4618002	0.4293762	563.4964
-43	13.093390	353.835	332.165	13.093390	0.566461	0.5349605	0.5017009	637.6483
-38	12.203865	346.520	332.165	12.203865	0.528049	0.5071343	0.4744323	605.3826
10536	16.278340	267.200	332.165	16.278340	0.464915	0.5944398	0.5590612	729.4050
10612	16.047825	267.200	332.165	16.047825	0.503634	0.6329369	0.5976156	757.8824
10690	16.485350	266.450	332.165	16.485350	0.448163	0.5799109	0.5444287	720.8126
10762	16.975485	266.000	332.165	16.975485	0.435743	0.5697970	0.5340014	719.3063
10835	17.668380	265.550	332.165	17.668380	0.473725	0.6112194	0.5748204	762.3558
10904	15.477845	266.350	332.165	15.477845	0.524962	0.6551124	0.6201108	766.3164
10972	15.780770	266.200	332.165	15.780770	0.567718	0.6994033	0.6640917	805.0912
11044	17.062450	266.200	332.165	17.062450	0.422194	0.5558514	0.5200306	708.9064
11113	14.071460	264.800	332.165	14.071460	0.541849	0.6724900	0.6383245	758.6501
11187	16.074465	265.150	332.165	16.074465	0.490152	0.6244483	0.5891307	750.8132
11258	17.405490	264.400	332.165	17.405490	0.513015	0.6530975	0.6167806	793.2758
21048	9.612870	189.635	332.165	9.612870	0.481180	0.8279965	0.7958570	791.1301
21173	10.006380	189.225	332.165	10.006380	0.491841	0.8428854	0.8105213	805.6657
21301	10.426695	188.645	332.165	10.426695	0.430404	0.7847575	0.7523211	776.3935
21433	8.329884	186.235	332.165	8.329884	0.490850	0.8447231	0.8131384	775.4739
21574	11.400080	186.595	332.165	11.400080	0.417916	0.7867560	0.7538175	796.3110
21716	10.645230	186.595	332.165	10.645230	0.460863	0.8260434	0.7934012	807.4680
21866	8.680892	189.370	332.165	8.680892	0.455234	0.7973083	0.7656732	755.0658
22031	10.720585	189.080	332.165	10.720585	0.430449	0.7847587	0.7521747	781.9261
22197	9.247492	191.270	332.165	9.247492	0.408191	0.7445416	0.7127664	731.7957

PET with orbital parameters

Find orbital parameters

Selected samples and their orbital parameters:

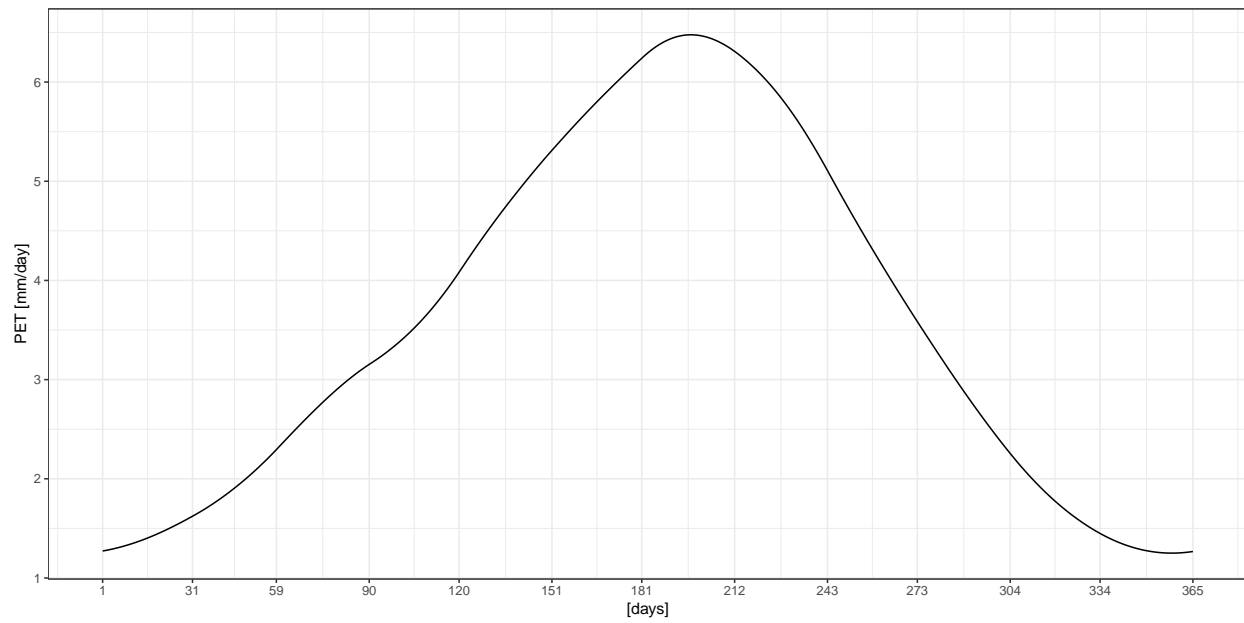
year	eps	ecc	varpi	epsp
-62	23.43821	0.0166988	283.10107	0.4211302
-56	23.43899	0.0167012	282.99828	0.4211293
-50	23.43977	0.0167037	282.89549	0.4211284
-43	23.44068	0.0167065	282.77558	0.4211273
6007	24.10588	0.0186835	180.75324	0.4138745
11044	24.19953	0.0195329	97.68662	0.4016794
21048	22.94125	0.0189846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



Plots

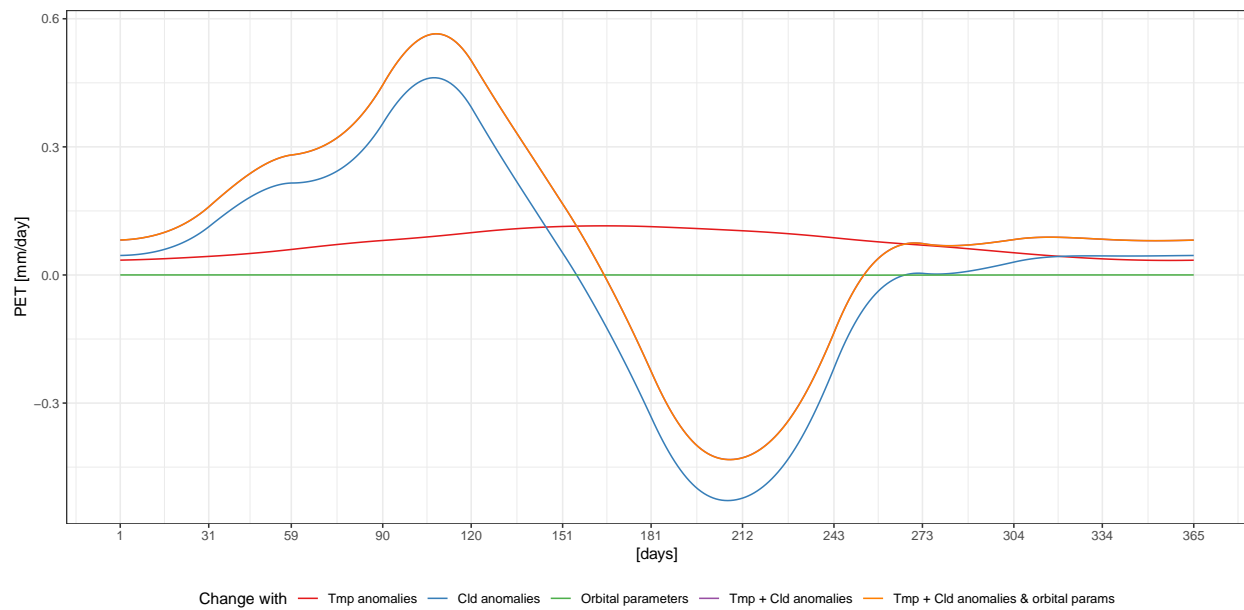
Modern PET

Obtained from CRU TS 4.04

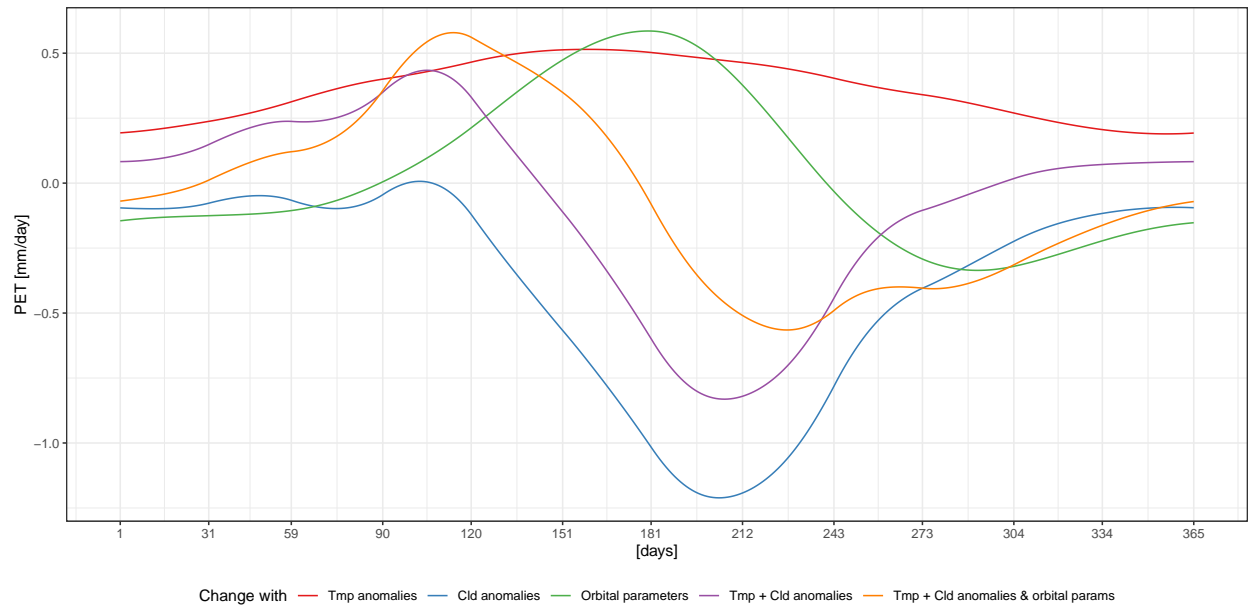


PET changes

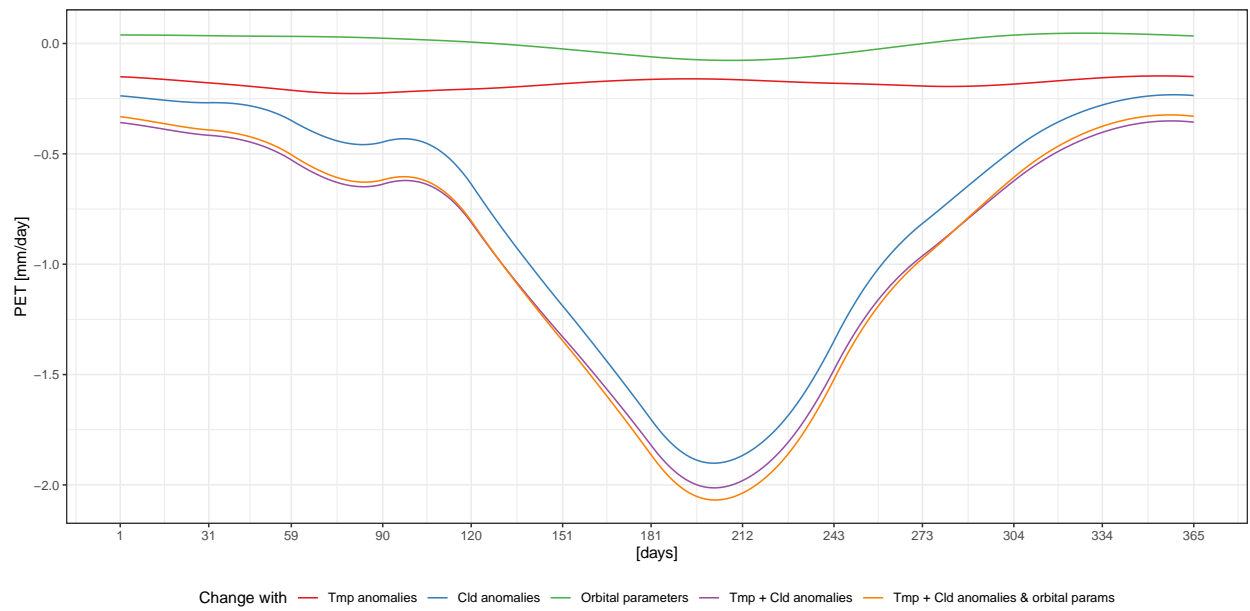
Padul: PET for age = -62 cal yr BP



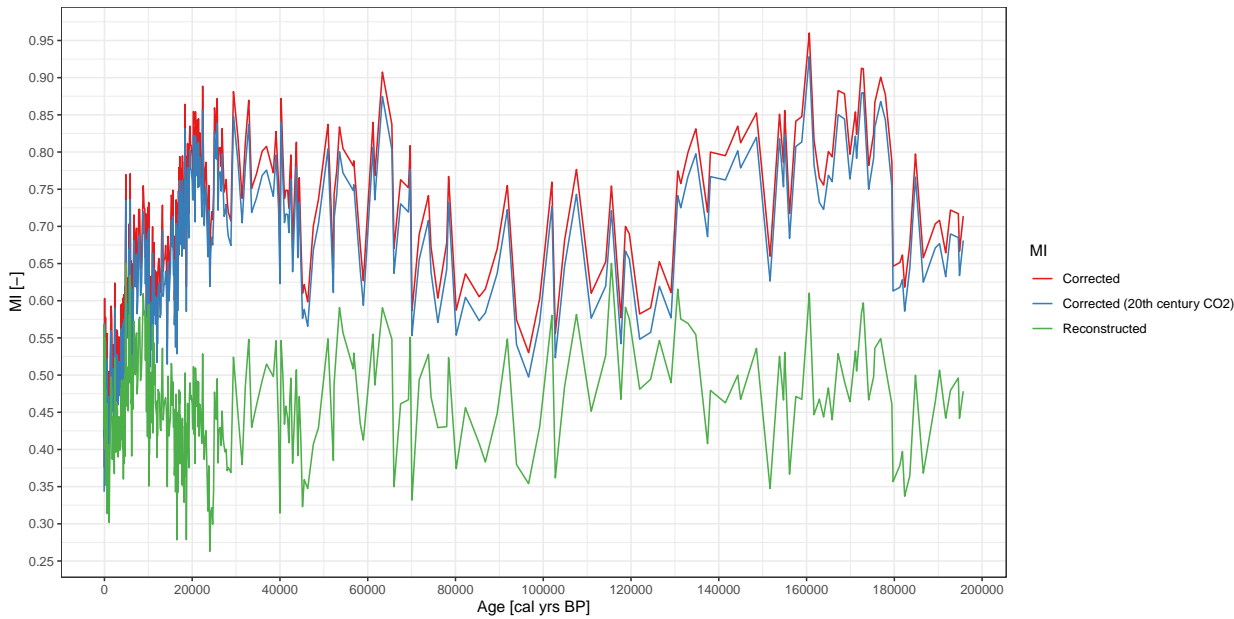
Padul: PET for age = 11044 cal yr BP



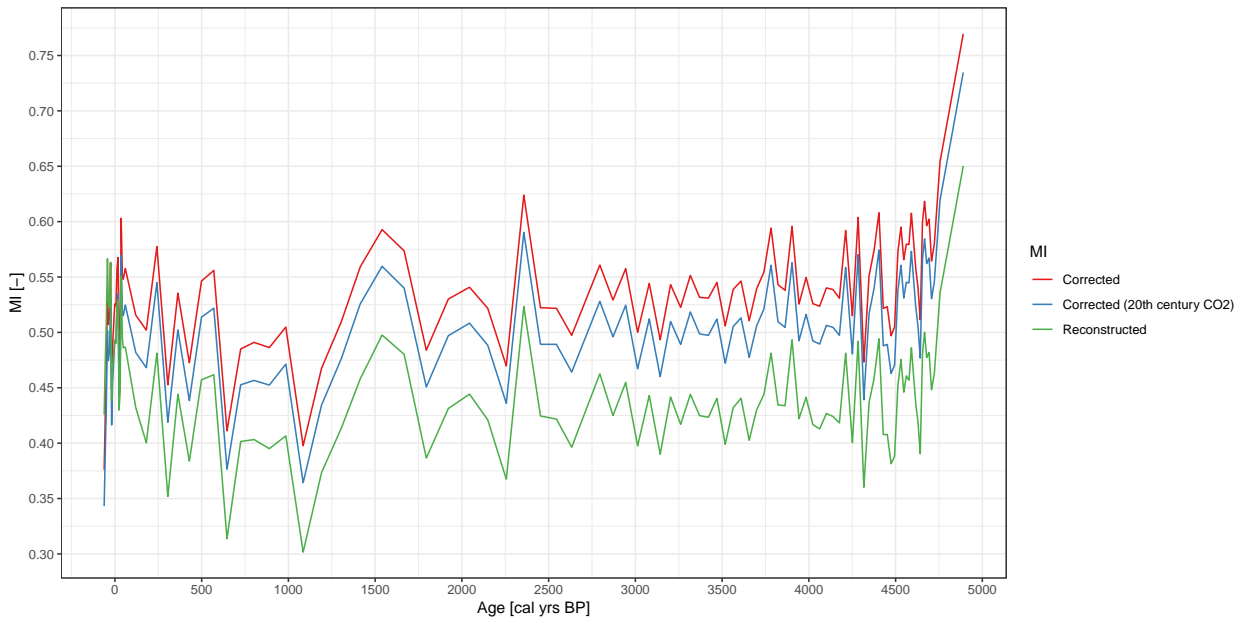
Padul: PET for age = 21048 cal yr BP



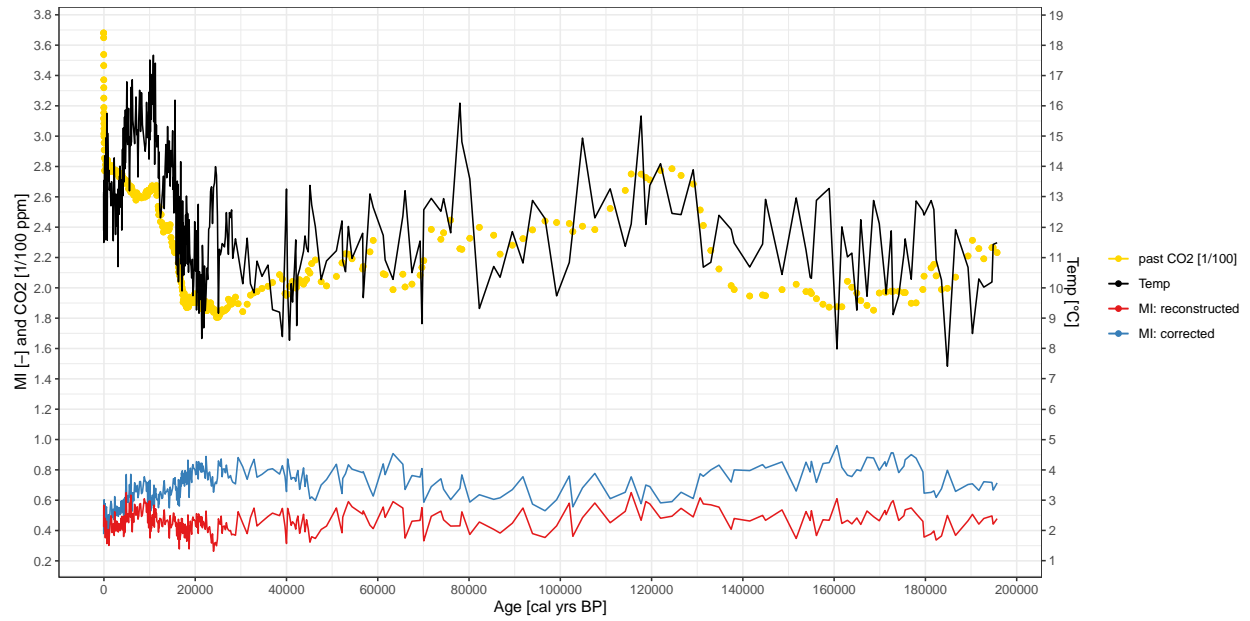
Reconstructed vs corrected MI: Past CO2 calculated using mean



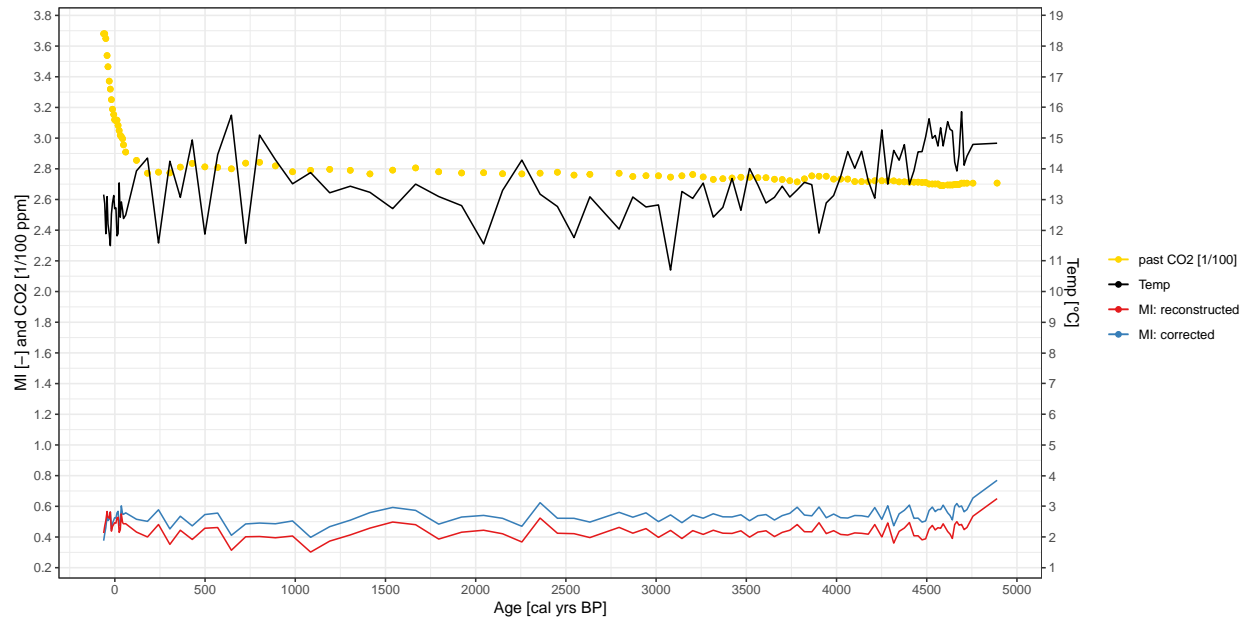
- age < 5k



Include past CO2 and Temperature

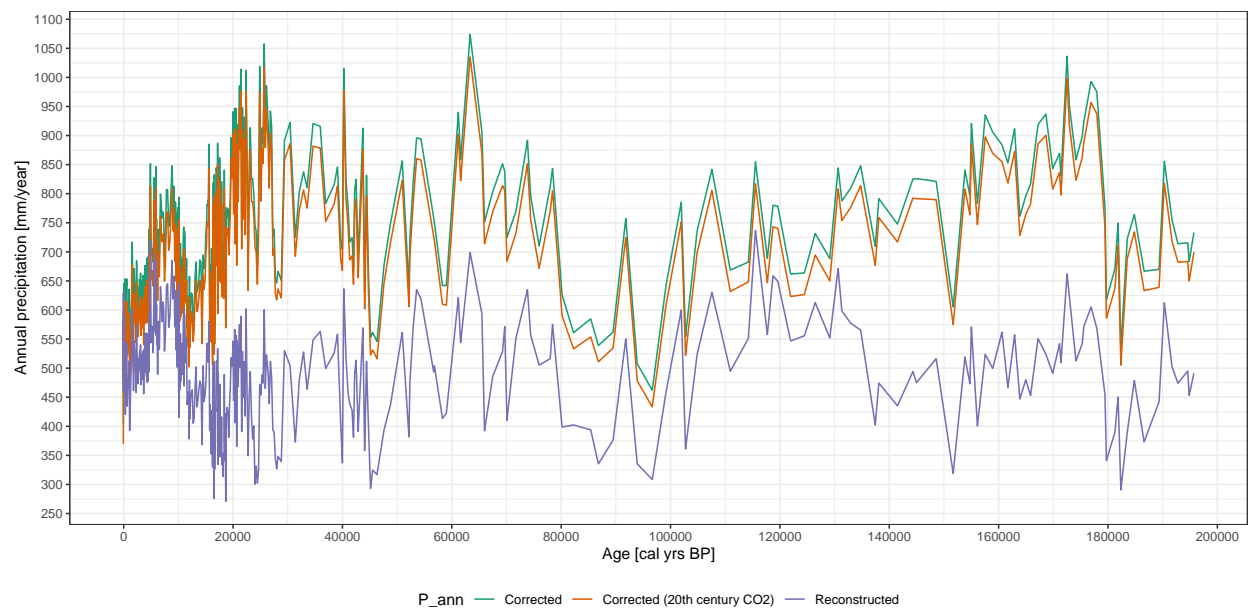


- age < 5k

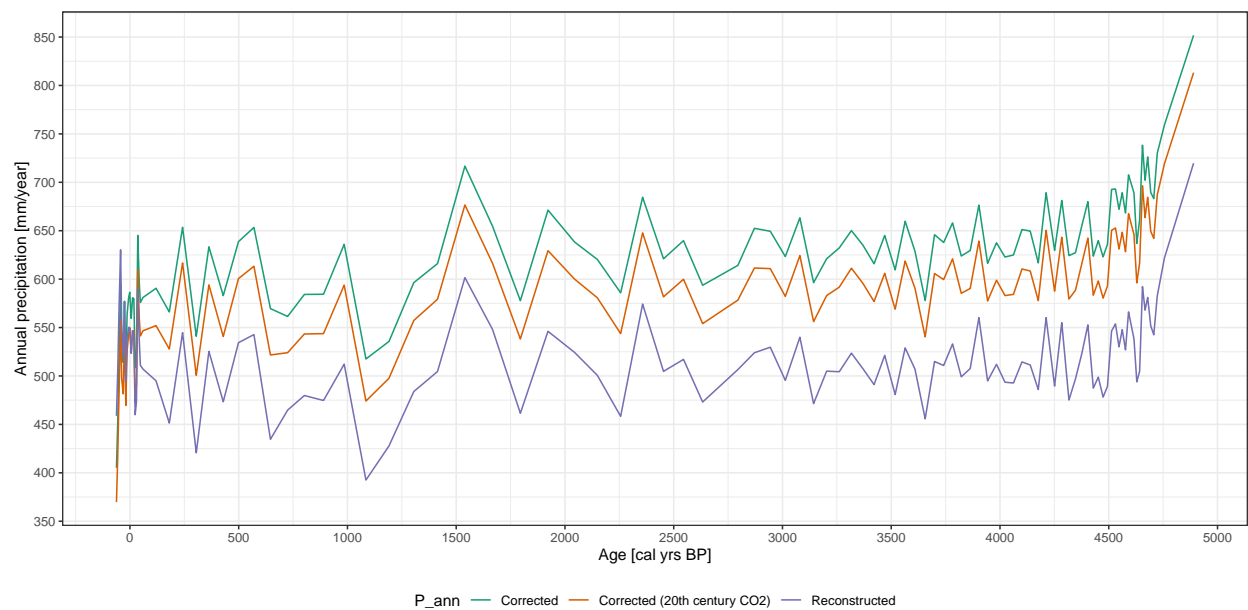


Reconstructed vs corrected P_{ann}: Past CO₂ calculated using mean

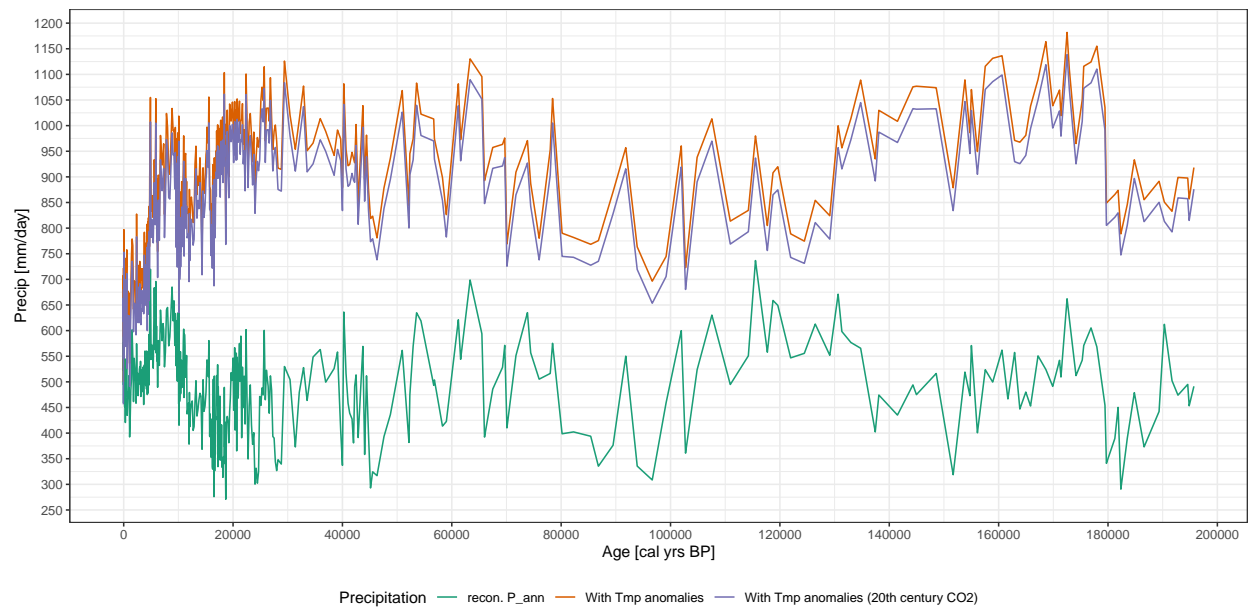
With MI ratio



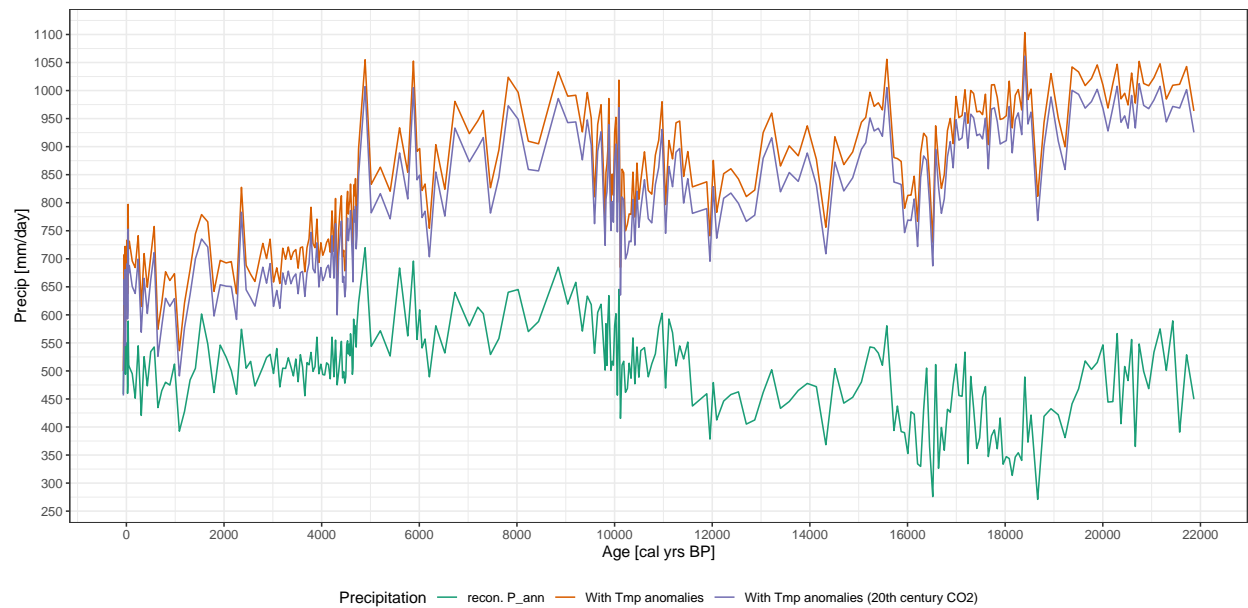
- age < 5k



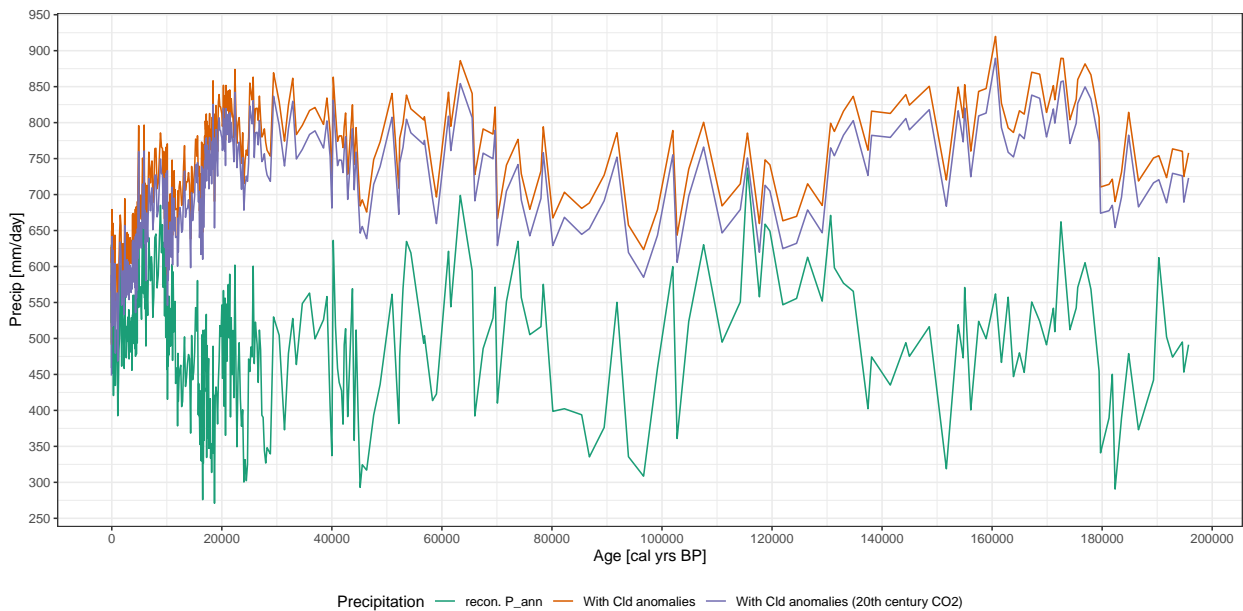
With temperature anomalies



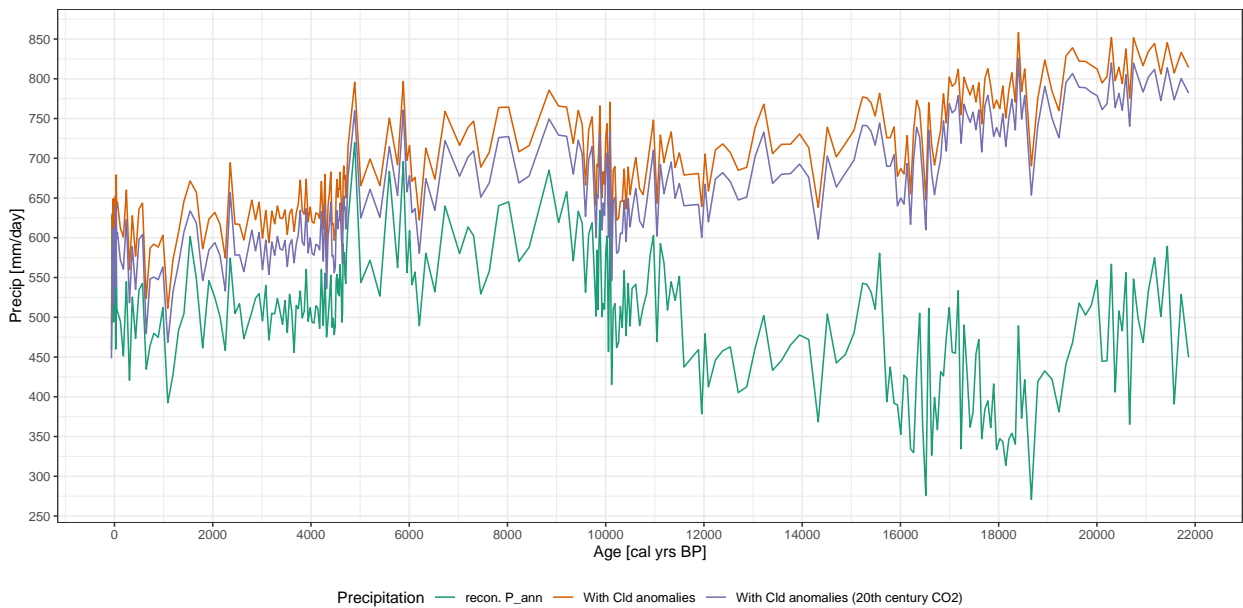
age < 22k



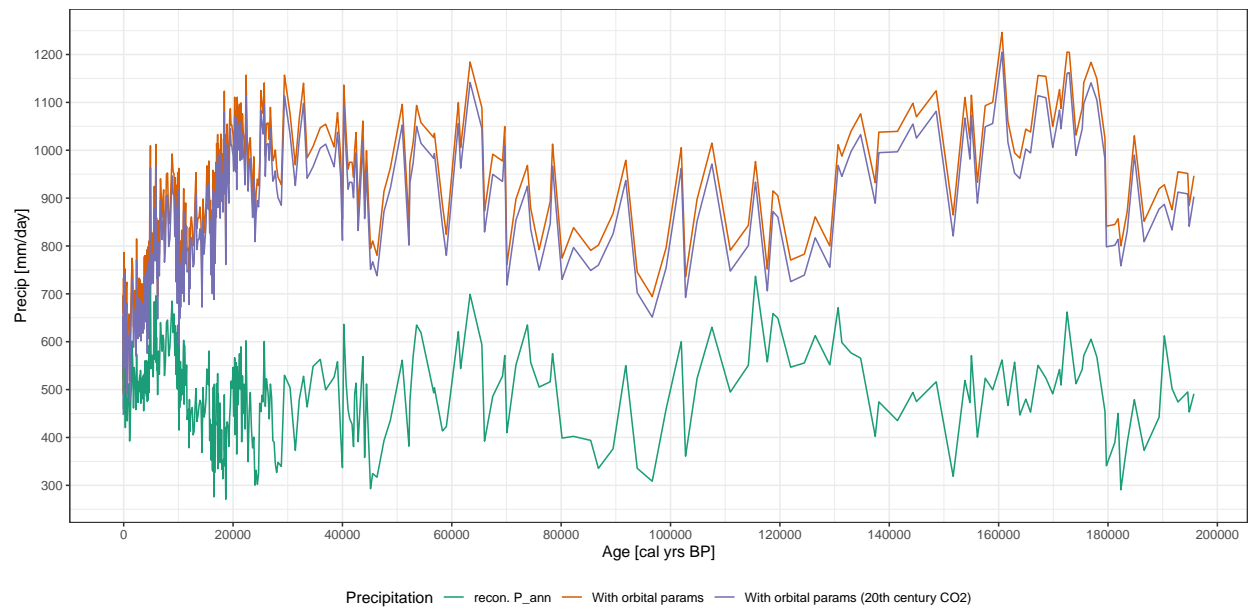
With cloud coverage anomalies



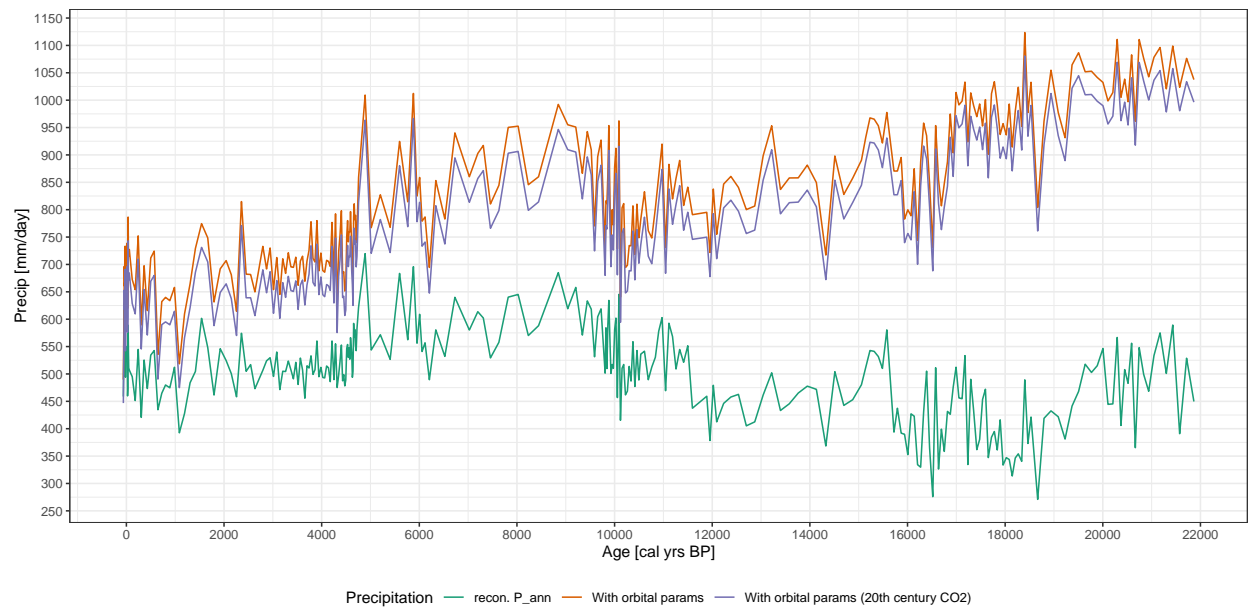
age < 22k



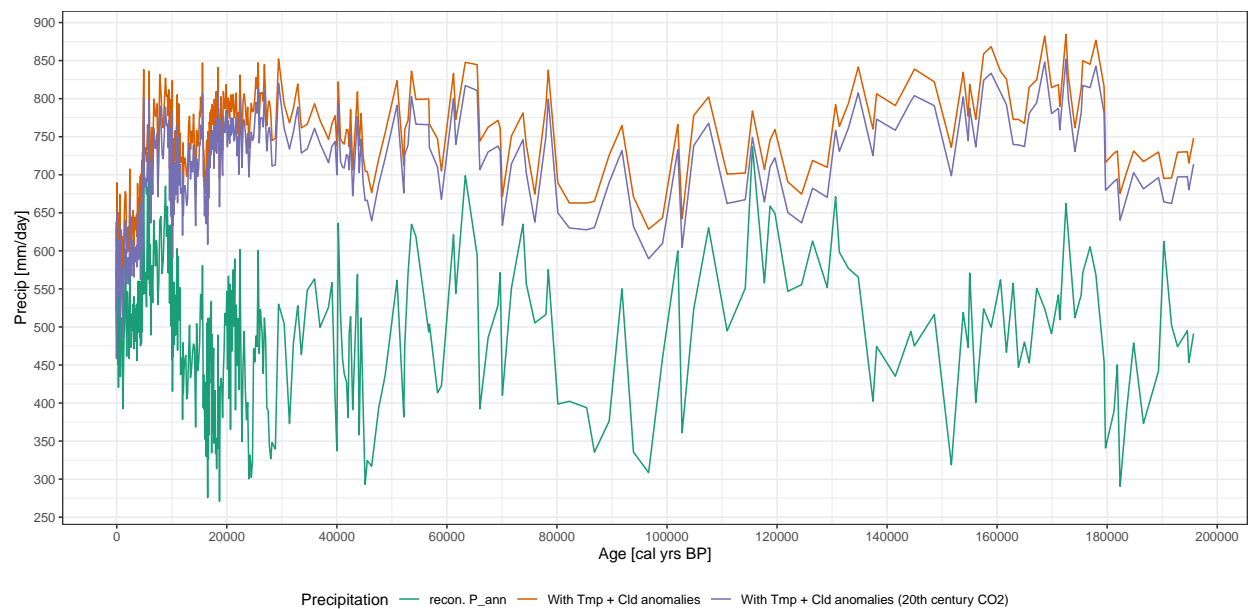
With orbital parameters



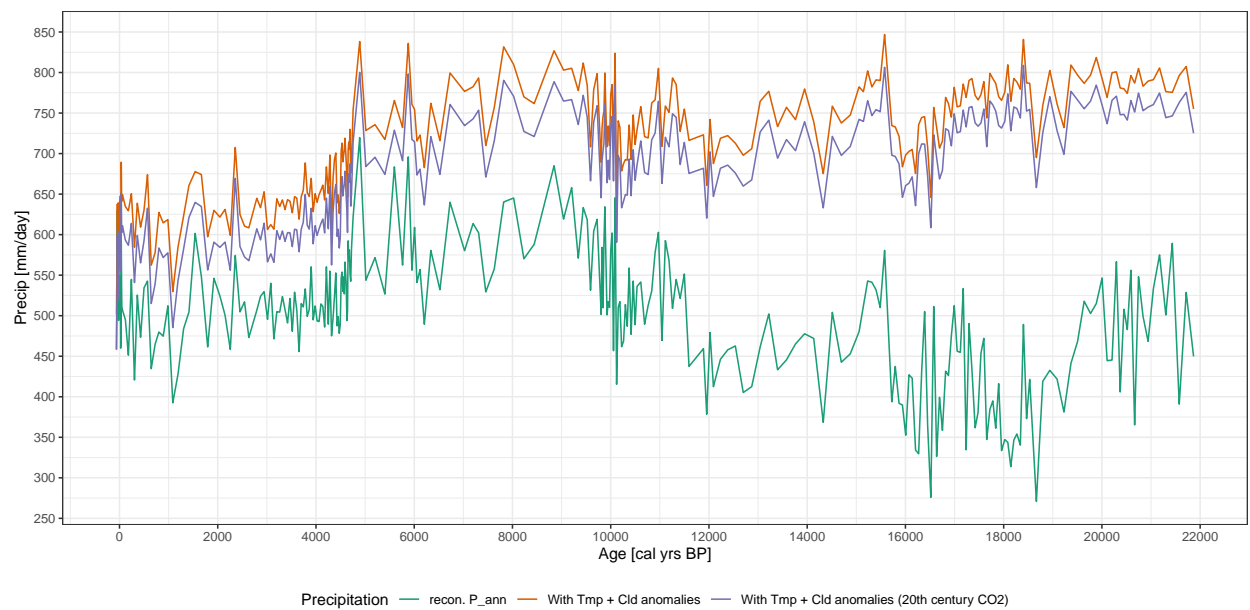
age < 22k



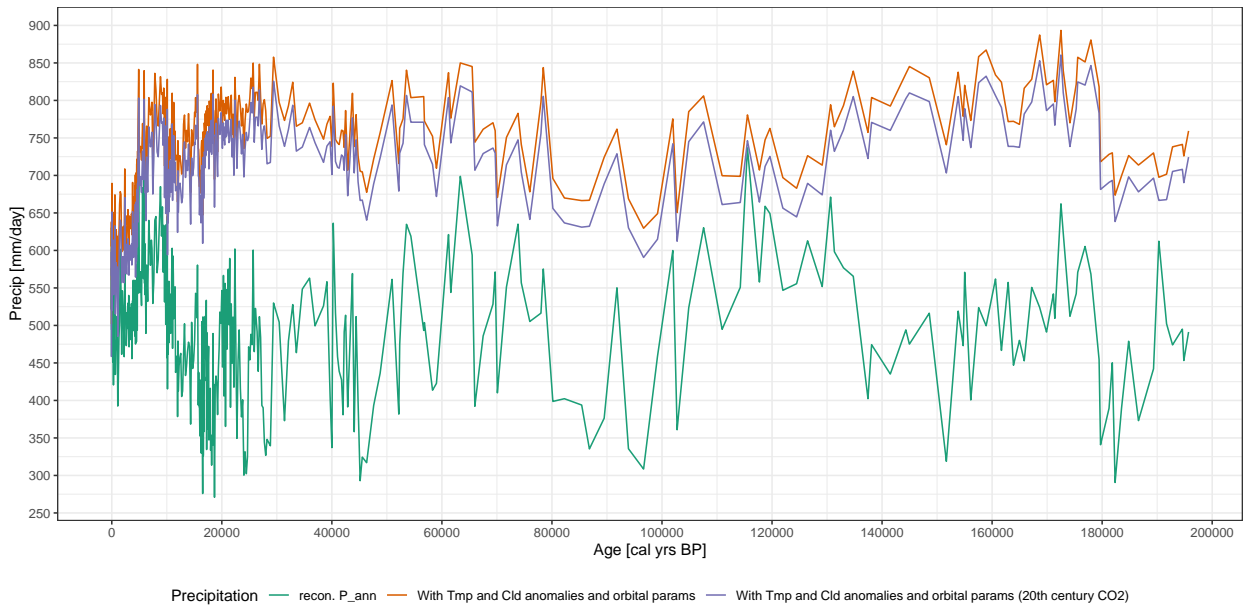
With temperature and cloud coverage anomalies



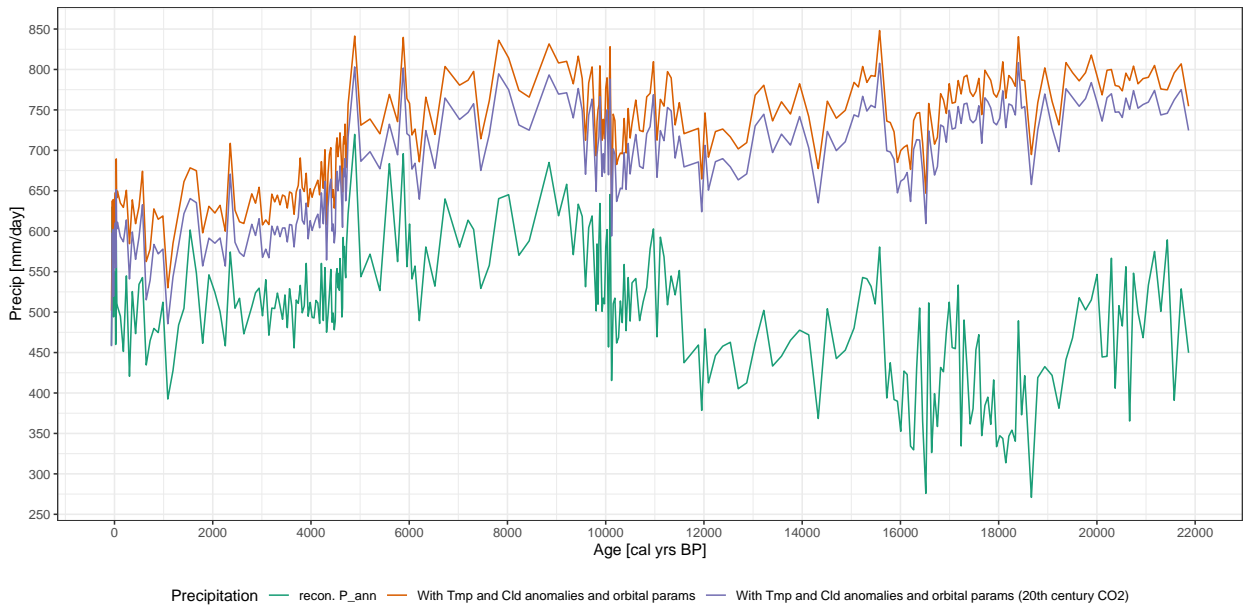
age < 22k



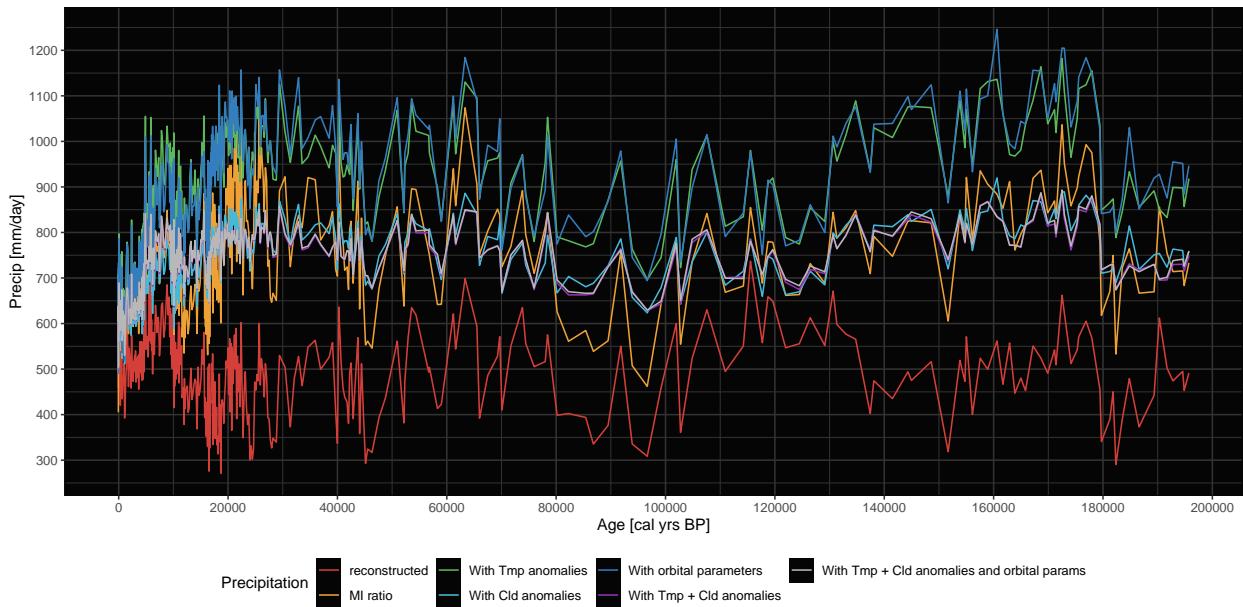
With temperature and cloud coverage anomalies and orbital parameters



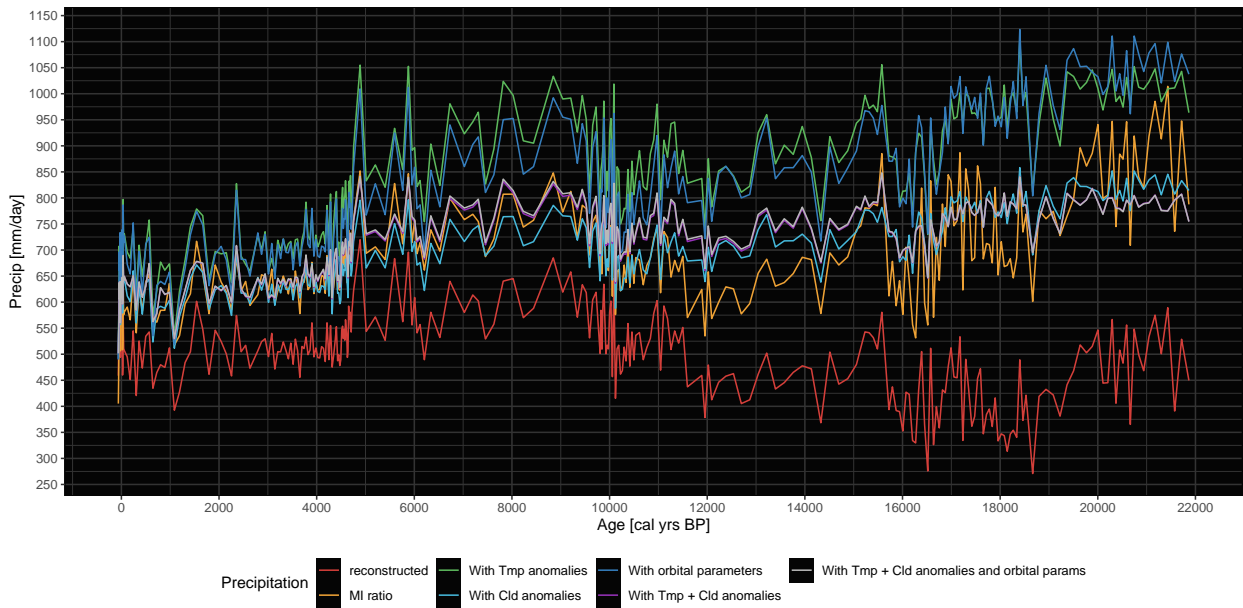
age < 22k



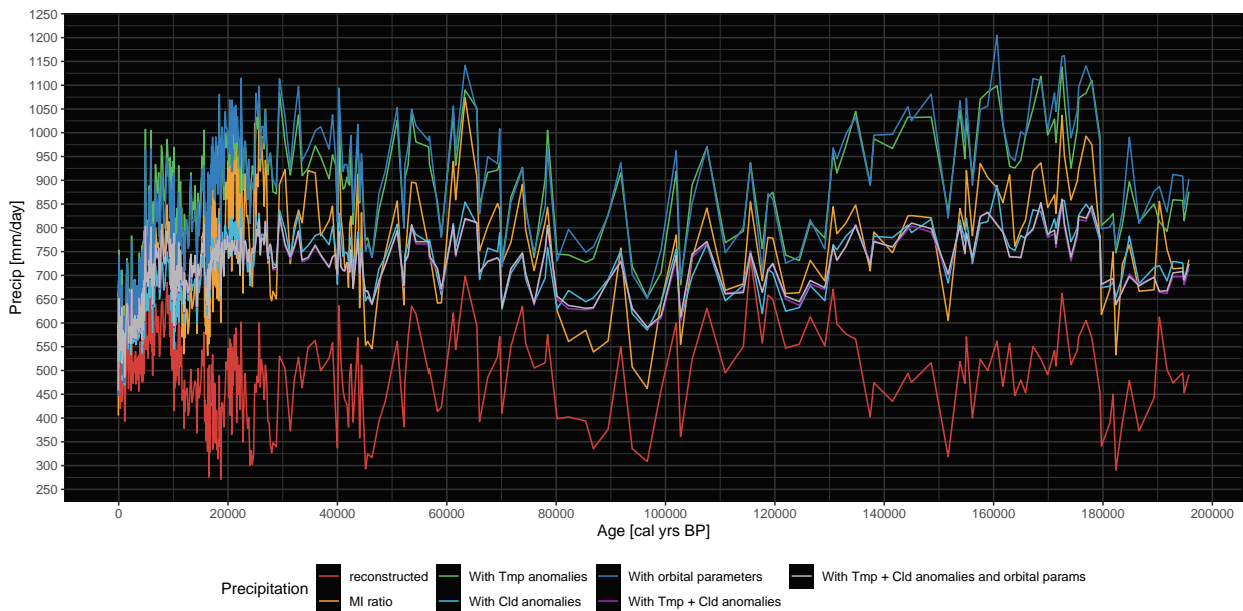
All the approaches



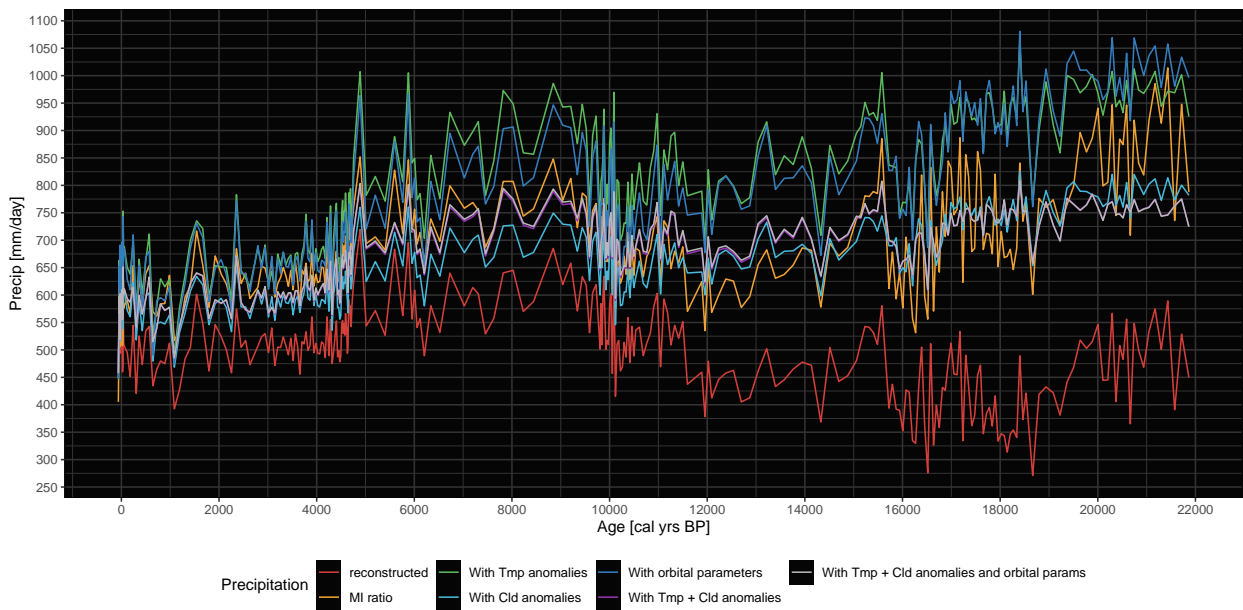
age < 22k

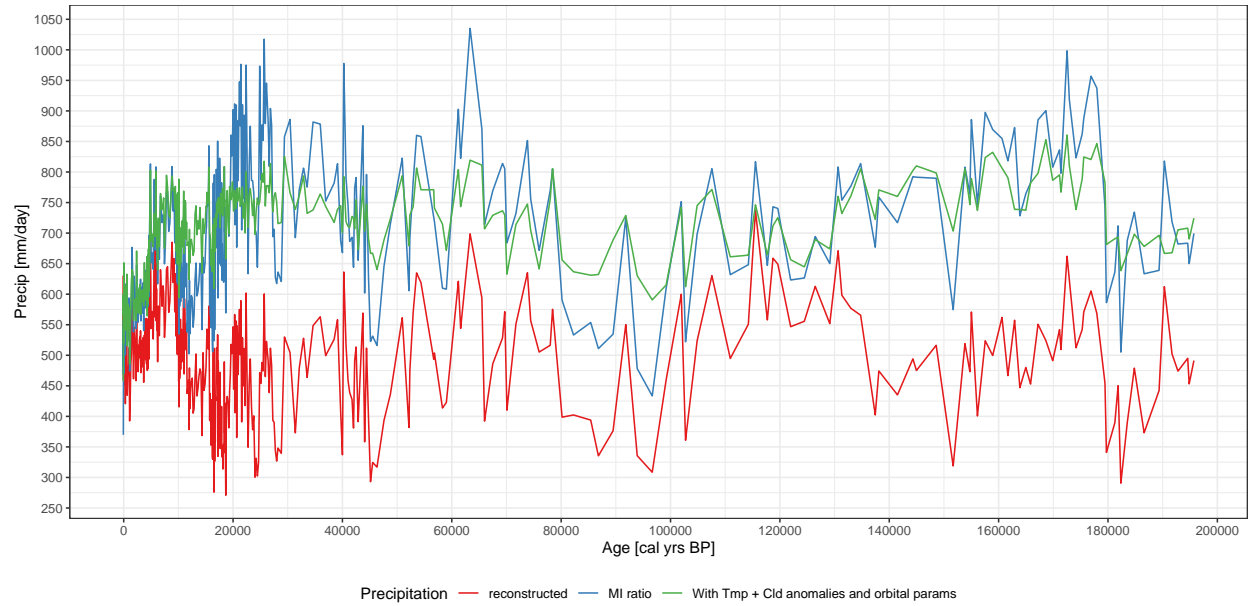


20th century CO2

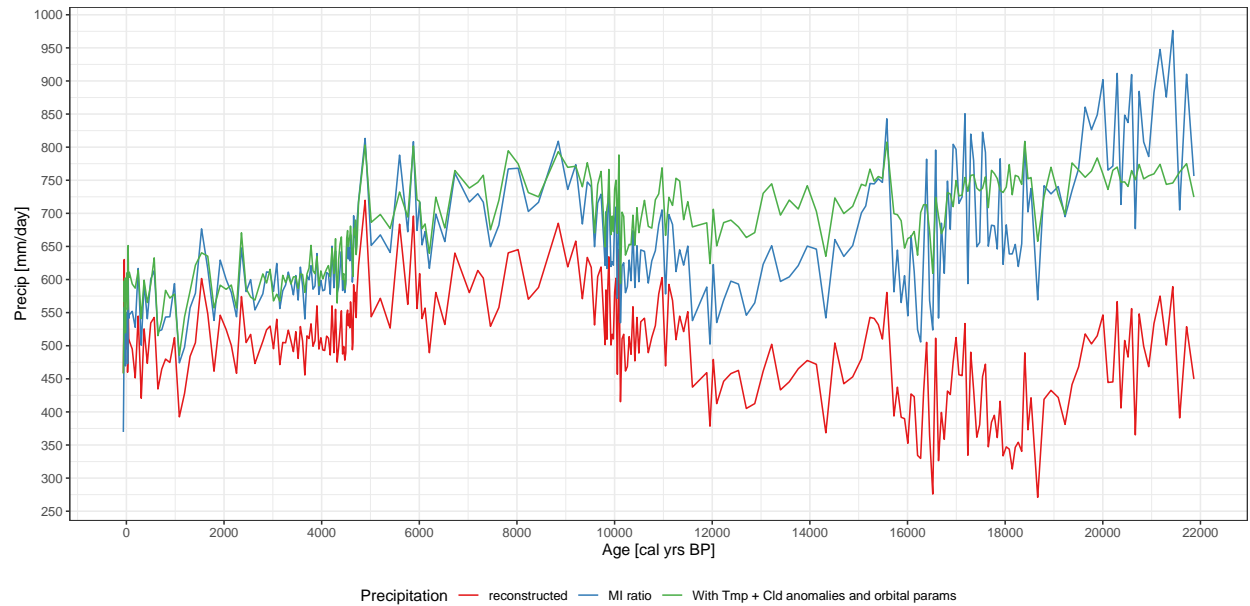


age < 22k





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)])

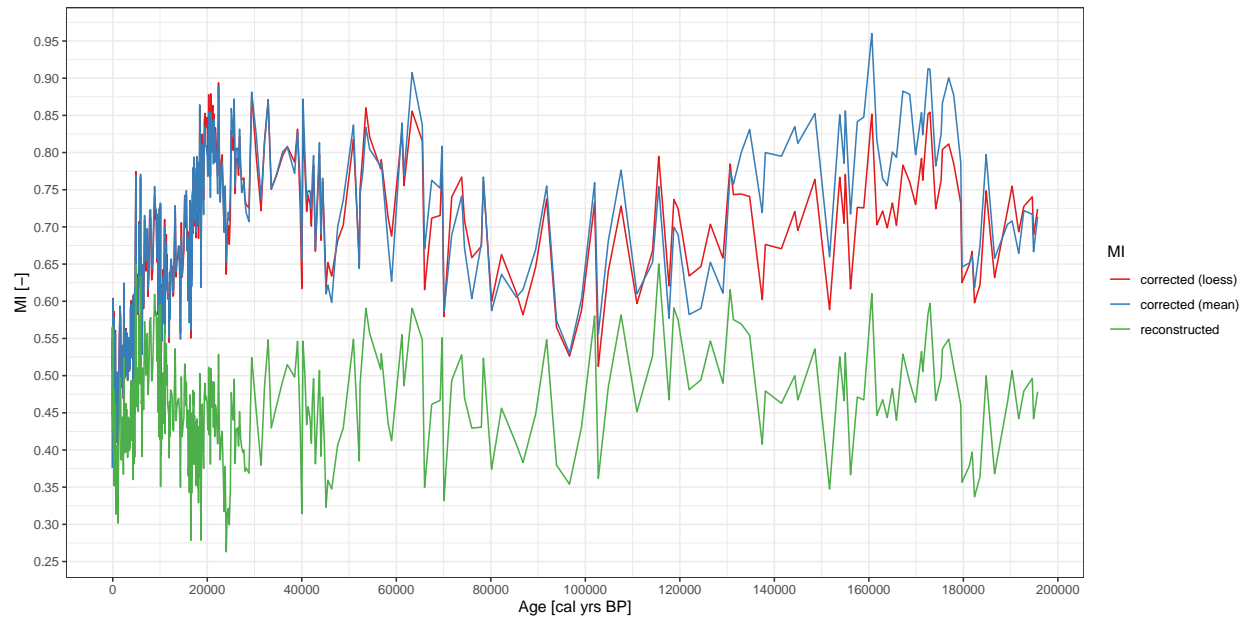
  if (age_calBP > max(ref_age))
    return(ref_co2[which.max(ref_age)])
  loessMod10 <- loess(co2 ~ age_calBP,
    tibble::tibble(age_calBP = ref_age,
      co2 = ref_co2), span = 0.1)
  return(predict(loessMod10, age_calBP))
}

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

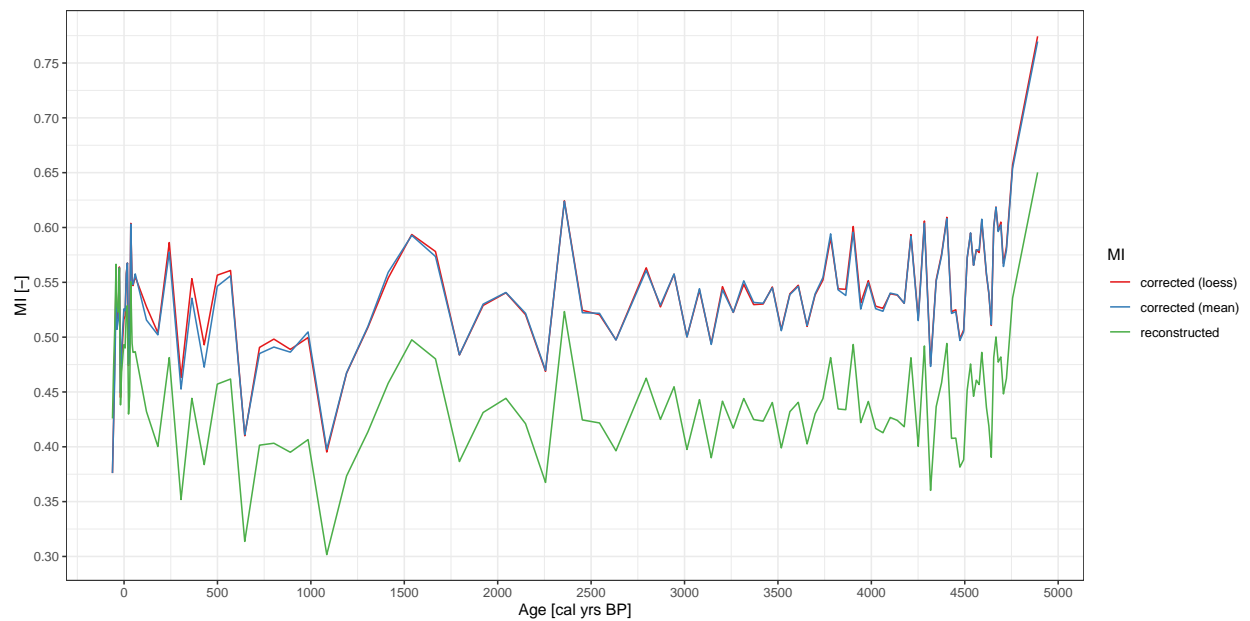
head(padul2, 10) %>%
  dplyr::select(-c(past_co2, corr_mi, corr_P_ann)) %>%
  knitr::kable() %>%
  kableExtra::kable_styling()
```

age_calBP	past_temp	modern_co2	present_t	recon_mi	corr_mi_20th	corr_P_ann_20th	past_co2_loess
-62	13.15918	332.165	13.15918	0.425809	0.3431377	369.7292	368.0200
-56	12.86272	332.165	12.86272	0.471798	0.3892587	417.9903	368.0200
-50	11.88472	332.165	11.88472	0.506921	0.4293762	483.2929	348.5771
-43	13.09339	332.165	13.09339	0.566461	0.5017009	558.1636	343.4588
-38	12.20387	332.165	12.20387	0.528049	0.4744323	497.1948	339.9523
-31	11.87980	332.165	11.87980	0.522880	0.4829125	481.5272	335.2524
-25	11.49567	332.165	11.49567	0.562884	0.5307318	543.8519	331.4182
-19	12.52563	332.165	12.52563	0.438233	0.4164441	469.5524	327.7633
-13	12.88969	332.165	12.88969	0.468382	0.4564923	525.6344	324.2577
-6	13.13016	332.165	13.13016	0.483879	0.4777764	543.2284	320.3318

A2. Plot reconstructed vs corrected MI both approaches

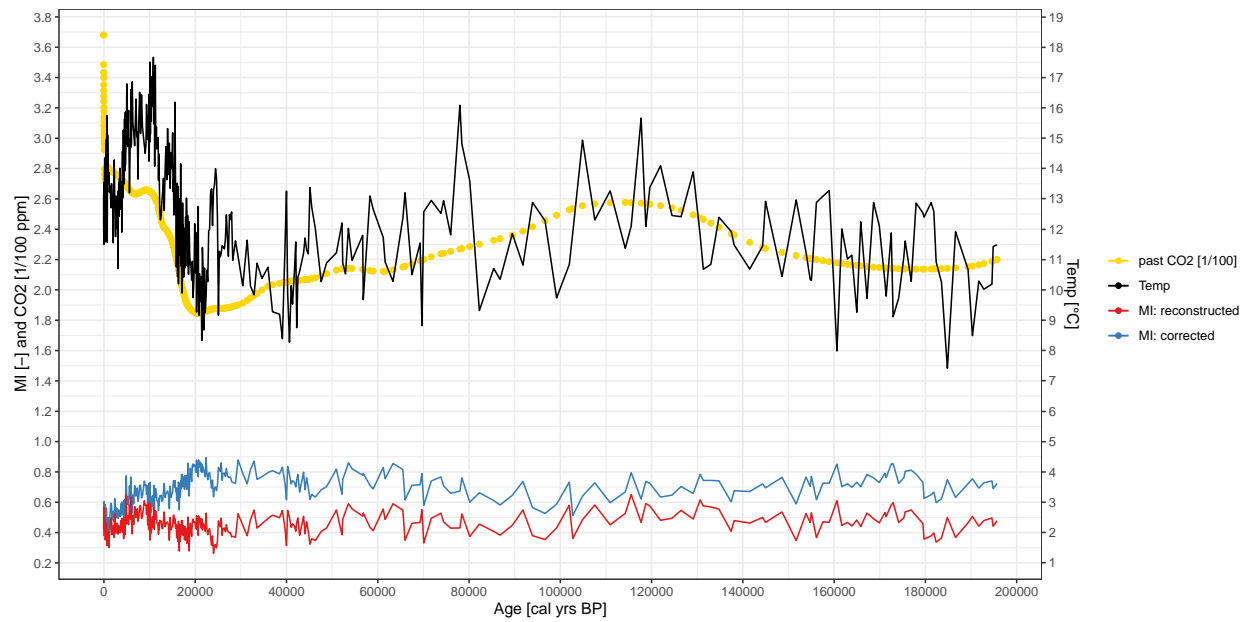


- age < 5k

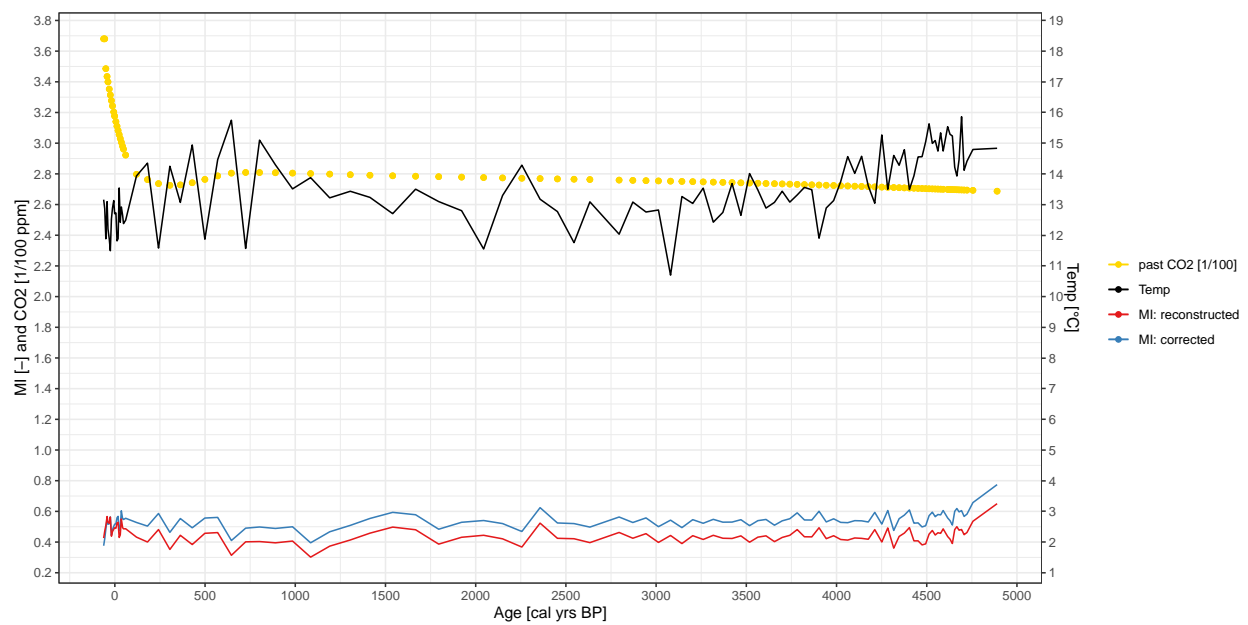


A3. Reconstructed vs corrected MI: Past CO2 calculated using loess

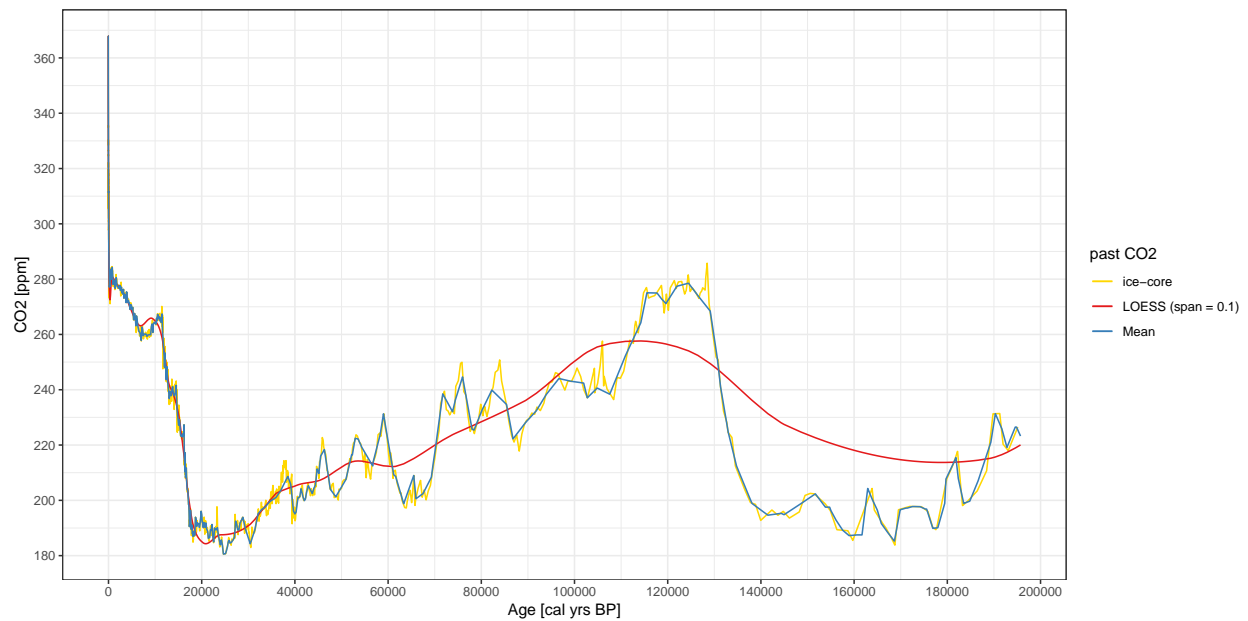
Include past CO2 and Temperature



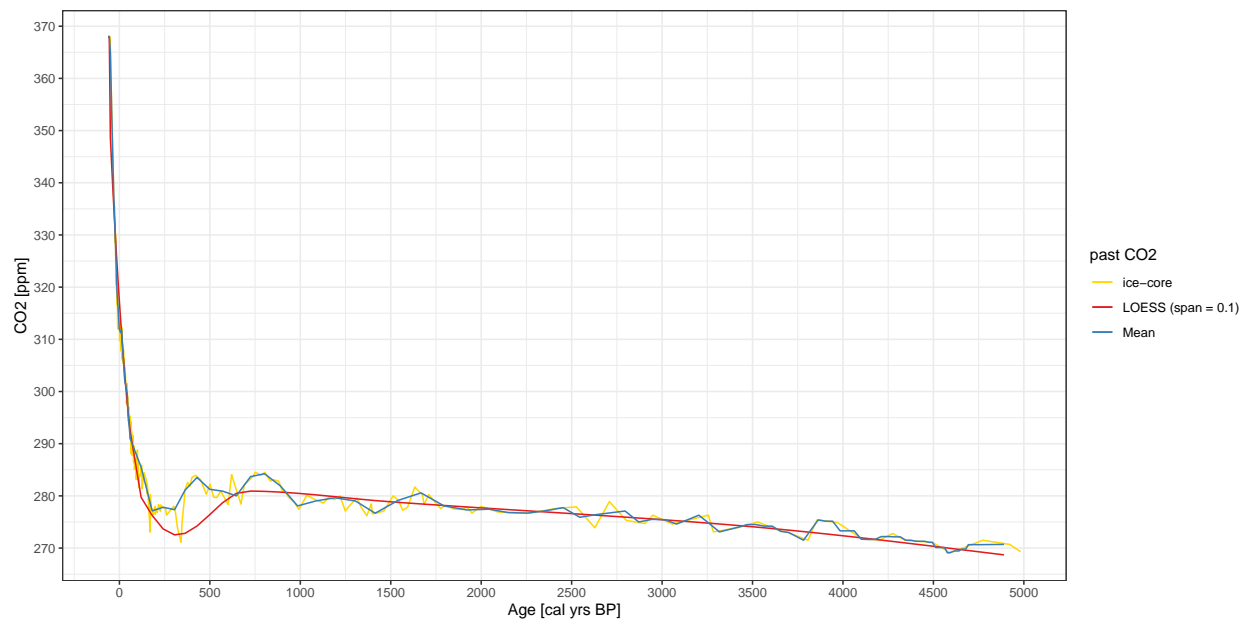
- age < 5k



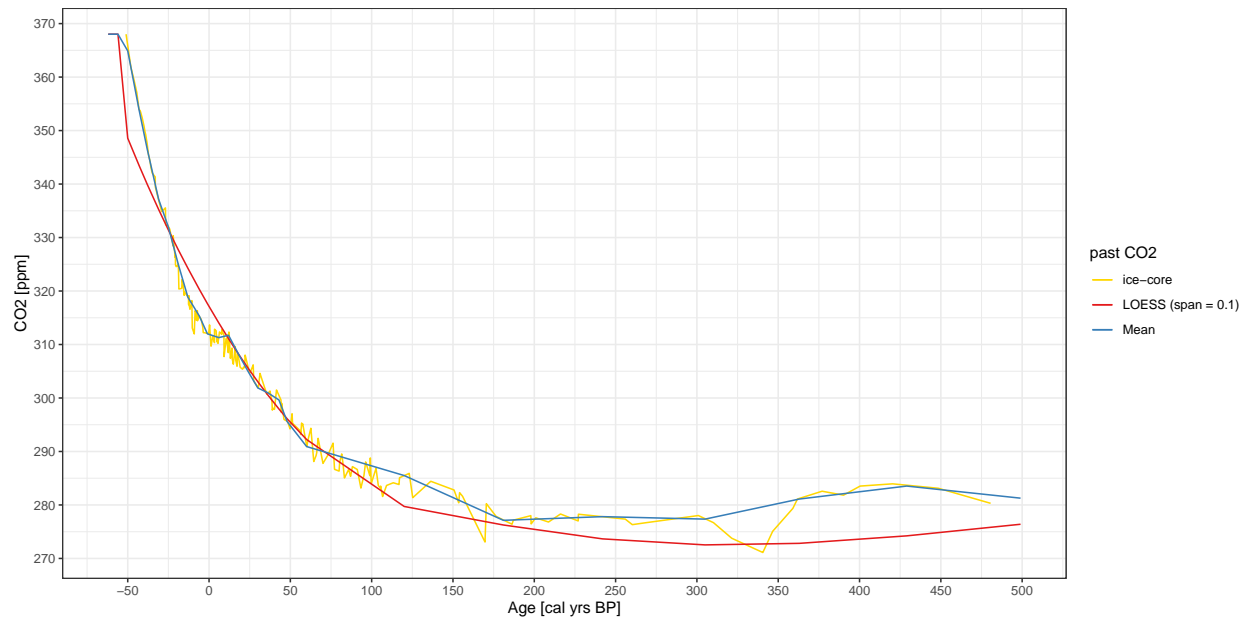
A4. Compare `codos::ice_core` vs past CO2 calculate using `mean` and `loess`



- age < 5k



- age < 500



A5. Padul Data

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

age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corr_mi	corr_mi_20th	corr_P_ann
-62	13.159180	368.020	332.165	13.159180	0.425809	0.3760503	0.3431377	405.1922
-56	12.862720	368.020	332.165	12.862720	0.471798	0.4221168	0.3892587	453.2738
-50	11.884725	364.900	332.165	11.884725	0.506921	0.4618002	0.4293762	519.7884
-43	13.093390	353.835	332.165	13.093390	0.566461	0.5349605	0.5017009	595.1664
-38	12.203865	346.520	332.165	12.203865	0.528049	0.5071343	0.4744323	531.4658
-31	11.879800	337.155	332.165	11.879800	0.522880	0.5154614	0.4829125	513.9827
-25	11.495670	331.960	332.165	11.495670	0.562884	0.5631923	0.5307318	577.1149
-19	12.525630	325.080	332.165	12.525630	0.438233	0.4491819	0.4164441	506.4652
-13	12.889695	318.840	332.165	12.889695	0.468382	0.4895278	0.4564923	563.6737
-6	13.130160	315.340	332.165	13.130160	0.483879	0.5109989	0.4777764	581.0022
-1	12.701260	312.000	332.165	12.701260	0.493117	0.5257325	0.4927145	586.4396
6	12.724970	311.290	332.165	12.724970	0.490124	0.5239663	0.4909395	559.4694
12	11.815300	311.730	332.165	11.815300	0.524648	0.5573214	0.5247072	580.8020
18	11.888230	308.260	332.165	11.888230	0.528909	0.5675918	0.5349146	579.8192
24	13.540305	304.970	332.165	13.540305	0.429877	0.4752556	0.4418854	508.5506
30	12.423860	301.880	332.165	12.423860	0.446556	0.4966752	0.4638791	526.5220
36	12.921615	301.000	332.165	12.921615	0.550525	0.6030754	0.5697481	645.1945
43	12.653010	299.630	332.165	12.653010	0.494339	0.5489607	0.5159135	595.4071
48	12.378860	295.610	332.165	12.378860	0.486138	0.5479682	0.5150739	575.9370
60	12.490615	290.920	332.165	12.490615	0.486739	0.5576914	0.5247127	581.0536
120	13.932820	285.500	332.165	13.932820	0.432149	0.5155913	0.4818933	590.5923
181	14.350570	277.130	332.165	14.350570	0.400314	0.5020436	0.4681291	566.0741
242	11.581430	277.815	332.165	11.581430	0.481347	0.5774559	0.5449170	653.5340
305	14.247445	277.355	332.165	14.247445	0.351935	0.4526236	0.4188929	541.0353
363	13.068665	281.110	332.165	13.068665	0.444194	0.5355065	0.5022595	633.4060
429	14.941955	283.535	332.165	14.941955	0.383781	0.4726124	0.4384079	582.9602
499	11.871105	281.270	332.165	11.871105	0.457146	0.5463811	0.5137634	638.7019
570	14.464090	280.910	332.165	14.464090	0.461804	0.5559625	0.5218460	653.3875
646	15.748480	280.005	332.165	15.748480	0.313710	0.4111004	0.3765371	569.5819
725	11.569615	283.690	332.165	11.569615	0.401503	0.4850587	0.4527444	561.4558
802	15.099470	284.240	332.165	15.099470	0.403256	0.4909761	0.4566272	584.2218
890	14.293475	281.905	332.165	14.293475	0.395018	0.4863099	0.4524686	584.3985

985	13.511010	278.075	332.165	13.511010	0.406559	0.5047773	0.4713522	635.9519
1085	13.877625	279.020	332.165	13.877625	0.301657	0.3977379	0.3643607	517.5456
1191	13.218835	279.640	332.165	13.218835	0.373369	0.4675299	0.4343624	535.6742
1305	13.432900	279.020	332.165	13.432900	0.413576	0.5096888	0.4762967	596.3927
1414	13.233040	276.675	332.165	13.233040	0.458016	0.5591412	0.5257437	616.0337
1540	12.702920	279.130	332.165	12.702920	0.497576	0.5928311	0.5596509	716.7204
1667	13.501385	280.575	332.165	13.501385	0.480201	0.5735822	0.5399952	654.6958
1795	13.096470	278.070	332.165	13.096470	0.386541	0.4839159	0.4507779	577.7605
1922	12.799950	277.300	332.165	12.799950	0.431293	0.5301282	0.4970448	671.2812
2044	11.551290	277.450	332.165	11.551290	0.444219	0.5407810	0.5083445	638.3621
2149	13.294700	276.800	332.165	13.294700	0.421076	0.5217671	0.4884249	620.3298
2256	14.283885	276.700	332.165	14.283885	0.367480	0.4697830	0.4359882	585.9043
2357	13.174110	277.150	332.165	13.174110	0.523369	0.6238425	0.5903218	684.5306
2453	12.771775	277.750	332.165	12.771775	0.424511	0.5222909	0.4892421	621.0315
2545	11.757505	275.900	332.165	11.757505	0.421738	0.5217299	0.4892306	639.7290
2633	13.088010	276.400	332.165	13.088010	0.396330	0.4973366	0.4641710	593.6718
2795	12.033940	277.100	332.165	12.033940	0.462588	0.5607947	0.5280560	614.2147
2871	13.081115	275.000	332.165	13.081115	0.424956	0.5291980	0.4959593	652.4915
2944	12.756910	275.500	332.165	12.756910	0.454794	0.5575963	0.5244708	649.4342
3013	12.822585	275.450	332.165	12.822585	0.397566	0.5001615	0.4671378	623.3167
3080	10.699305	274.600	332.165	10.699305	0.443022	0.5441841	0.5121733	663.3422
3143	13.261510	275.450	332.165	13.261510	0.390003	0.4933269	0.4600726	596.3732
3203	13.035830	276.300	332.165	13.035830	0.441610	0.5430765	0.5098298	621.0276
3261	13.535495	274.700	332.165	13.535495	0.416972	0.5226467	0.4891640	632.2307
3317	12.425060	273.100	332.165	12.425060	0.444067	0.5514078	0.5184801	650.0850
3370	12.743310	273.550	332.165	12.743310	0.424860	0.5316493	0.4985937	635.0459
3421	13.684420	274.000	332.165	13.684420	0.423377	0.5309297	0.4973401	615.8504
3470	12.647450	274.500	332.165	12.647450	0.440416	0.5450816	0.5120469	645.1111
3518	14.010410	274.500	332.165	14.010410	0.399001	0.5058797	0.4721596	609.5823
3564	13.475130	274.200	332.165	13.475130	0.432065	0.5388454	0.5053581	659.7231
3609	12.885270	274.200	332.165	12.885270	0.440593	0.5463440	0.5131740	628.9008
3656	13.071425	273.200	332.165	13.071425	0.402640	0.5106322	0.4774438	577.9615
3699	13.434470	273.000	332.165	13.434470	0.430108	0.5394536	0.5059883	645.8761
3741	13.080005	272.250	332.165	13.080005	0.444006	0.5544472	0.5211480	637.8629

3782	13.312910	271.500	332.165	13.312910	0.481336	0.5942146	0.5606862	658.0746
3822	13.559430	273.450	332.165	13.559430	0.434527	0.5431486	0.5096020	623.9096
3863	13.483015	275.400	332.165	13.483015	0.433829	0.5379996	0.5045098	629.5464
3903	11.902960	275.150	332.165	11.902960	0.493315	0.5956784	0.5629266	676.4735
3943	12.888460	275.150	332.165	12.888460	0.422033	0.5255796	0.4924579	616.3471
3984	13.129820	273.300	332.165	13.129820	0.441372	0.5495606	0.5162450	637.5333
4023	13.747505	273.300	332.165	13.747505	0.416761	0.5259395	0.4923252	622.8348
4062	14.563010	273.300	332.165	14.563010	0.412826	0.5236002	0.4895032	624.9690
4101	14.015225	271.700	332.165	14.015225	0.426782	0.5401745	0.5063674	651.2352
4139	14.572930	271.650	332.165	14.572930	0.424069	0.5387138	0.5045734	649.6073
4176	13.604615	271.650	332.165	13.604615	0.418275	0.5308782	0.4973352	616.8099
4212	13.041955	272.200	332.165	13.041955	0.481193	0.5919728	0.5586044	689.2057
4251	15.268020	272.200	332.165	15.268020	0.400423	0.5150937	0.4805779	629.7829
4284	13.499280	272.150	332.165	13.499280	0.491962	0.6038350	0.5701756	681.2215
4317	14.600530	272.150	332.165	14.600530	0.360241	0.4732703	0.4392750	624.2937
4347	14.278675	271.500	332.165	14.278675	0.436612	0.5510864	0.5170945	627.3074
4376	14.787685	271.500	332.165	14.787685	0.458481	0.5742183	0.5398572	654.9703
4404	13.491295	271.300	332.165	13.491295	0.494253	0.6080464	0.5743814	680.0077
4429	13.935795	271.300	332.165	13.935795	0.407680	0.5216574	0.4879428	623.7548
4452	14.553305	271.300	332.165	14.553305	0.407926	0.5231958	0.4891058	639.7627
4474	14.558790	271.100	332.165	14.558790	0.381470	0.4969865	0.4629580	623.0083
4494	15.045370	271.100	332.165	15.045370	0.388216	0.5048414	0.4704919	636.0103
4513	15.631435	270.100	332.165	15.631435	0.451673	0.5725120	0.5376181	692.6833
4531	14.992585	270.100	332.165	14.992585	0.475532	0.5951224	0.5605811	693.0425
4547	15.086240	270.100	332.165	15.086240	0.446055	0.5655991	0.5310723	672.1417
4562	14.741750	270.100	332.165	14.741750	0.460775	0.5796790	0.5453329	689.2012
4577	15.337330	269.100	332.165	15.337330	0.456752	0.5793233	0.5446023	668.3744
4591	14.744645	269.100	332.165	14.744645	0.486113	0.6075855	0.5731684	707.6838
4616	15.537315	269.450	332.165	15.537315	0.435921	0.5579427	0.5231466	688.9704
4629	15.289300	269.450	332.165	15.289300	0.418996	0.5402924	0.5057000	636.8742
4642	15.236480	269.450	332.165	15.236480	0.390457	0.5113796	0.4768931	661.3658
4655	14.217500	269.800	332.165	14.217500	0.481282	0.5999146	0.5658395	738.2953
4667	13.929305	269.800	332.165	13.929305	0.500180	0.6183572	0.5844095	702.1404
4679	14.456340	269.800	332.165	14.456340	0.477212	0.5963290	0.5621175	726.1685

4693	15.862295	270.650	332.165	15.862295	0.481918	0.6022537	0.5671334	689.6166
4707	14.117130	270.650	332.165	14.117130	0.448255	0.5644327	0.5305052	683.1216
4723	14.411470	270.650	332.165	14.411470	0.462332	0.5792553	0.5451134	730.0029
4756	14.795020	270.650	332.165	14.795020	0.535625	0.6540085	0.6194448	759.2128
4890	14.834370	270.700	332.165	14.834370	0.650277	0.7696128	0.7347375	851.8032
5015	16.790890	268.950	332.165	16.790890	0.458337	0.5848183	0.5491130	693.7914
5202	14.724575	269.800	332.165	14.724575	0.510507	0.6305058	0.5960443	706.0729
5403	15.916575	265.300	332.165	15.916575	0.451895	0.5850365	0.5499238	681.8049
5596	13.197670	267.600	332.165	13.197670	0.580824	0.7032332	0.6695068	827.6391
5763	14.989795	265.700	332.165	14.989795	0.490060	0.6202548	0.5856527	711.8730
5879	14.690215	263.100	332.165	14.690215	0.633639	0.7708372	0.7360496	846.5488
5953	16.610490	263.700	332.165	16.610490	0.488720	0.6280917	0.5924005	714.7859
6007	14.797680	266.700	332.165	14.797680	0.526236	0.6538954	0.6193303	756.6240
6056	15.365505	266.100	332.165	15.365505	0.462299	0.5921872	0.5574160	692.9720
6118	15.526410	265.500	332.165	15.526410	0.467143	0.5989413	0.5640493	714.0708
6206	16.861230	264.350	332.165	16.861230	0.391183	0.5286278	0.4930179	661.4162
6338	15.520625	262.700	332.165	15.520625	0.510261	0.6493941	0.6143791	738.8311
6523	15.196245	261.150	332.165	15.196245	0.454215	0.5957861	0.5611141	697.8861
6729	14.751830	260.750	332.165	14.751830	0.572781	0.7153865	0.6806975	799.3348
7025	16.292160	257.850	332.165	16.292160	0.500633	0.6543141	0.6187738	758.3348
7198	15.048425	262.650	332.165	15.048425	0.548170	0.6865608	0.6517564	768.6583
7311	15.212085	261.850	332.165	15.212085	0.556734	0.6976429	0.6627064	754.6289
7457	13.652665	259.550	332.165	13.652665	0.474606	0.6163186	0.5825392	687.3527
7630	15.563800	260.100	332.165	15.563800	0.496452	0.6421277	0.6071028	721.4294
7821	16.512985	260.050	332.165	16.512985	0.573211	0.7225810	0.6867157	807.1422
8024	15.154520	260.200	332.165	15.154520	0.577937	0.7230766	0.6881135	807.2078
8233	16.430325	259.300	332.165	16.430325	0.492751	0.6429634	0.6073579	744.0210
8442	15.368730	259.800	332.165	15.368730	0.507928	0.6539428	0.6190148	757.1465
8847	14.772840	259.950	332.165	14.772840	0.609482	0.7545422	0.7197430	848.0735
9040	14.501085	259.850	332.165	14.501085	0.580817	0.7250987	0.6905417	772.9279
9205	14.772915	262.850	332.165	14.772915	0.585610	0.7231640	0.6884426	812.6231
9340	16.114460	263.750	332.165	16.114460	0.519646	0.6578384	0.6224092	722.8708
9441	15.439775	262.900	332.165	15.439775	0.577847	0.7169430	0.6818112	785.9044
9522	14.951680	260.750	332.165	14.951680	0.548766	0.6916589	0.6569032	779.3266

9589	15.205050	263.800	332.165	15.205050	0.450967	0.5859564	0.5513035	690.4345
9654	15.017930	263.800	332.165	15.017930	0.546659	0.6821093	0.6473353	754.1535
9723	15.199465	263.800	332.165	15.199465	0.569147	0.7052838	0.6703363	766.9585
9806	15.815015	264.400	332.165	15.815015	0.417580	0.5523430	0.5173799	663.3221
9823	14.884225	264.400	332.165	14.884225	0.487888	0.6209583	0.5864207	743.6346
9843	16.120400	264.400	332.165	16.120400	0.480904	0.6170986	0.5817688	654.1756
9862	14.437820	264.400	332.165	14.437820	0.524941	0.6572672	0.6229166	737.8360
9882	14.242735	264.400	332.165	14.242735	0.593003	0.7255073	0.6911079	776.0528
9903	15.793380	264.300	332.165	15.793380	0.493796	0.6294995	0.5943559	722.7702
9925	16.457260	264.300	332.165	16.457260	0.428127	0.5649567	0.5295318	661.1147
9951	15.717115	264.300	332.165	15.717115	0.473277	0.6085786	0.5735379	665.2050
9975	15.131305	264.300	332.165	15.131305	0.453730	0.5873335	0.5527239	660.5427
10001	15.323460	264.200	332.165	15.323460	0.532910	0.6680219	0.6330878	728.1653
10028	14.871245	264.100	332.165	14.871245	0.558392	0.6928471	0.6581391	746.9642
10057	17.511240	264.100	332.165	17.511240	0.414236	0.5543920	0.5182550	611.4431
10089	15.605590	264.100	332.165	15.605590	0.595404	0.7321112	0.6968329	793.5987
10120	16.048725	264.000	332.165	16.048725	0.350761	0.4864695	0.4515187	576.1199
10153	16.008700	263.700	332.165	16.008700	0.473838	0.6114125	0.5761718	658.5370
10187	15.144115	263.700	332.165	15.144115	0.481948	0.6173318	0.5826393	662.6005
10222	16.486195	264.550	332.165	16.486195	0.392532	0.5284612	0.4931097	621.6687
10262	17.041910	264.550	332.165	17.041910	0.394061	0.5315330	0.4957894	632.1269
10299	15.637060	265.700	332.165	15.637060	0.427851	0.5590644	0.5242007	671.2939
10337	15.631225	265.300	332.165	15.631225	0.426451	0.5586135	0.5237547	637.9457
10376	15.559980	264.900	332.165	15.559980	0.479709	0.6131854	0.5782357	714.3840
10415	16.365245	266.200	332.165	16.365245	0.414970	0.5467033	0.5113874	628.4934
10458	16.276965	266.200	332.165	16.276965	0.484494	0.6166639	0.5812297	690.7803
10497	16.349345	266.200	332.165	16.349345	0.438019	0.5699320	0.5345677	636.1558
10536	16.278340	267.200	332.165	16.278340	0.464915	0.5944398	0.5590612	685.5451
10612	16.047825	267.200	332.165	16.047825	0.503634	0.6329369	0.5976156	680.6176
10690	16.485350	266.450	332.165	16.485350	0.448163	0.5799109	0.5444287	633.3650
10762	16.975485	266.000	332.165	16.975485	0.435743	0.5697970	0.5340014	670.3405
10835	17.668380	265.550	332.165	17.668380	0.473725	0.6112194	0.5748204	684.3864
10904	15.477845	266.350	332.165	15.477845	0.524962	0.6551124	0.6201108	721.5456
10972	15.780770	266.200	332.165	15.780770	0.567718	0.6994033	0.6640917	742.7176

11044	17.062450	266.200	332.165	17.062450	0.422194	0.5558514	0.5200306	618.0624
11113	14.071460	264.800	332.165	14.071460	0.541849	0.6724900	0.6383245	735.5442
11187	16.074465	265.150	332.165	16.074465	0.490152	0.6244483	0.5891307	723.9876
11258	17.405490	264.400	332.165	17.405490	0.513015	0.6530975	0.6167806	648.0638
11333	15.502385	264.455	332.165	15.502385	0.543125	0.6781680	0.6430926	680.1121
11414	14.840655	266.320	332.165	14.840655	0.487248	0.6155602	0.5810634	658.5833
11499	15.364930	267.415	332.165	15.364930	0.513904	0.6410910	0.6061976	687.9393
11594	14.643270	261.000	332.165	14.643270	0.462316	0.6028760	0.5685334	570.4055
11888	15.016305	253.730	332.165	15.016305	0.445394	0.6054028	0.5708210	624.3359
11954	13.614930	251.455	332.165	13.614930	0.389403	0.5505321	0.5169353	535.0851
12022	14.482675	248.130	332.165	14.482675	0.465376	0.6389381	0.6046052	657.9987
12091	14.124780	253.345	332.165	14.124780	0.417931	0.5759768	0.5420163	568.5155
12234	12.575605	249.090	332.165	12.575605	0.480760	0.6461285	0.6128908	599.7547
12382	12.307820	243.655	332.165	12.307820	0.477946	0.6569149	0.6237987	629.3062
12537	12.471630	248.330	332.165	12.471630	0.474711	0.6416920	0.6085223	625.4804
12698	12.908245	242.915	332.165	12.908245	0.428726	0.6109540	0.5776153	577.4612
12871	13.249050	240.295	332.165	13.249050	0.425493	0.6160835	0.5825388	597.3068
13043	13.682535	236.770	332.165	13.682535	0.483385	0.6864737	0.6525057	655.4494
13218	12.610745	239.410	332.165	12.610745	0.536082	0.7285436	0.6950886	682.4526
13397	13.914370	237.830	332.165	13.914370	0.439547	0.6397563	0.6057651	630.6158
13578	14.723270	239.845	332.165	14.723270	0.458435	0.6560675	0.6215434	637.5548
13762	13.627845	241.110	332.165	13.627845	0.466207	0.6563712	0.6225087	654.8521
13947	15.317390	238.245	332.165	15.317390	0.469603	0.6744173	0.6394711	686.0701
14133	13.802605	237.820	332.165	13.802605	0.450253	0.6502360	0.6162855	681.5468
14327	14.841775	238.940	332.165	14.841775	0.349928	0.5490719	0.5147396	578.1363
14512	13.351390	241.600	332.165	13.351390	0.498382	0.6866640	0.6528890	694.6069
14695	14.525705	233.200	332.165	14.525705	0.418140	0.6341923	0.5998447	671.2392
14877	13.996235	230.035	332.165	13.996235	0.433336	0.6571723	0.6230895	686.9314
15056	15.177935	227.185	332.165	15.177935	0.443005	0.6812646	0.6463909	738.6348
15144	13.245490	229.240	332.165	13.245490	0.489104	0.7132202	0.6794420	746.4704
15231	13.647995	229.225	332.165	13.647995	0.515634	0.7418868	0.7078041	781.0304
15317	12.467560	227.640	332.165	12.467560	0.513872	0.7402031	0.7067997	779.6597
15402	13.452520	225.065	332.165	13.452520	0.492902	0.7310910	0.6971494	788.7845
15486	14.472345	223.400	332.165	14.472345	0.459350	0.7070082	0.6725136	785.0923

15576	16.186575	223.145	332.165	16.186575	0.491031	0.7486788	0.7129707	885.0624
15722	12.524460	223.510	332.165	12.524460	0.429873	0.6679443	0.6346826	611.8904
15793	12.398135	223.610	332.165	12.398135	0.430739	0.6679773	0.6347852	678.2171
15870	10.760215	222.935	332.165	10.760215	0.453890	0.6870568	0.6546814	593.1736
15939	12.350730	223.770	332.165	12.350730	0.365376	0.6007761	0.5677707	641.0606
16006	12.724970	223.400	332.165	12.724970	0.375637	0.6139589	0.5807156	576.3372
16072	13.518925	224.360	332.165	13.518925	0.366020	0.6045449	0.5708724	705.4984
16137	10.445880	223.635	332.165	10.445880	0.441893	0.6715047	0.6393225	642.6686
16206	13.415415	227.320	332.165	13.415415	0.342865	0.5712063	0.5376748	556.9188
16269	11.893750	216.390	332.165	11.893750	0.422392	0.6807448	0.6477957	531.3584
16330	10.199119	213.515	332.165	10.199119	0.474221	0.7357019	0.7034919	667.8984
16391	11.017990	210.360	332.165	11.017990	0.442874	0.7180931	0.6855141	818.9693
16452	11.550620	217.190	332.165	11.550620	0.395824	0.6495110	0.6168177	598.4869
16517	11.802705	208.300	332.165	11.802705	0.278469	0.5612737	0.5286568	556.0836
16576	11.148750	208.555	332.165	11.148750	0.448982	0.7312501	0.6985730	832.8426
16635	12.849935	210.805	332.165	12.849935	0.375400	0.6566239	0.6232079	570.8570
16694	13.012700	211.700	332.165	13.012700	0.341791	0.6199859	0.5865664	724.1347
16753	12.077215	207.890	332.165	12.077215	0.363719	0.6511590	0.6181817	641.8638
16818	14.158905	205.360	332.165	14.158905	0.373298	0.6817721	0.6475311	788.2482
16876	10.790900	204.060	332.165	10.790900	0.451034	0.7477069	0.7151741	706.6724
16935	12.048430	203.625	332.165	12.048430	0.390956	0.6944435	0.6613787	844.5526
16994	10.837725	203.625	332.165	10.837725	0.480079	0.7792150	0.7465846	831.4884
17053	10.031810	203.210	332.165	10.031810	0.465448	0.7617816	0.7295929	746.5295
17118	9.895848	200.365	332.165	9.895848	0.461283	0.7672979	0.7351624	756.5424
17177	10.426055	198.460	332.165	10.426055	0.477632	0.7939271	0.7614697	886.7585
17236	12.864705	198.290	332.165	12.864705	0.380516	0.7089965	0.6754460	623.3131
17295	11.274705	195.265	332.165	11.274705	0.446154	0.7788716	0.7460172	855.8032
17354	12.146745	190.500	332.165	12.146745	0.404584	0.7611678	0.7278907	815.4563
17419	11.463015	191.325	332.165	11.463015	0.396909	0.7455343	0.7126600	679.4859
17478	10.420725	192.240	332.165	10.420725	0.424005	0.7633979	0.7310141	685.2099
17537	12.035565	192.495	332.165	12.035565	0.385468	0.7324979	0.6993494	861.5955
17596	11.631775	196.375	332.165	11.631775	0.438248	0.7684239	0.7354064	827.7782
17655	11.983090	193.795	332.165	11.983090	0.352284	0.6928103	0.6597846	682.9477
17720	11.907815	189.965	332.165	11.907815	0.419211	0.7769087	0.7437236	712.5448

17779	10.722560	189.475	332.165	10.722560	0.441874	0.7948424	0.7622339	710.2773
17838	11.743250	190.365	332.165	11.743250	0.407721	0.7623798	0.7293174	675.4221
17898	12.404180	190.990	332.165	12.404180	0.365678	0.7208364	0.6875144	820.3304
17957	11.455935	188.600	332.165	11.455935	0.376603	0.7360852	0.7032369	652.0380
18023	12.783990	187.790	332.165	12.783990	0.349292	0.7203357	0.6868034	715.9472
18084	13.026125	188.615	332.165	13.026125	0.392178	0.7624505	0.7286793	668.3053
18145	12.796495	186.945	332.165	12.796495	0.328991	0.7032848	0.6697865	670.6015
18207	12.380540	187.265	332.165	12.380540	0.382299	0.7537789	0.7203911	683.3616
18269	10.786970	188.775	332.165	10.786970	0.431274	0.7872889	0.7546654	646.4573
18339	12.451600	187.925	332.165	12.451600	0.363905	0.7324814	0.6991054	685.1274
18402	11.038440	188.340	332.165	11.038440	0.502894	0.8641927	0.8312604	840.6638
18466	12.180700	187.270	332.165	12.180700	0.381802	0.7518922	0.7186187	734.6350
18530	10.514090	187.670	332.165	10.514090	0.435265	0.7943740	0.7618715	768.9549
18666	12.243875	193.900	332.165	12.243875	0.278691	0.6185362	0.5855465	601.3156
18796	11.128360	192.970	332.165	11.128360	0.398897	0.7388196	0.7061352	776.1294
18939	10.852120	190.605	332.165	10.852120	0.461861	0.8114278	0.7787147	760.0113
19087	10.722190	191.900	332.165	10.722190	0.409936	0.7520962	0.7195879	773.9178
19227	10.324510	191.335	332.165	10.324510	0.375349	0.7166252	0.6843980	727.6510
19370	10.942980	191.550	332.165	10.942980	0.472478	0.8189576	0.7861805	764.9941
19504	9.740445	190.235	332.165	9.740445	0.489560	0.8348616	0.8026450	798.1629
19639	10.050925	191.420	332.165	10.050925	0.467545	0.8092355	0.7769276	896.2732
19768	10.674020	193.600	332.165	10.674020	0.472280	0.8088485	0.7762318	861.0105
19886	12.180290	196.060	332.165	12.180290	0.465912	0.8012734	0.7678823	885.7153
20003	10.977170	194.890	332.165	10.977170	0.461431	0.7943062	0.7615692	940.7351
20106	10.556615	192.095	332.165	10.556615	0.427358	0.7682028	0.7357401	798.9915
20206	11.882545	192.095	332.165	11.882545	0.431126	0.7800290	0.7468500	805.6864
20295	9.269087	190.230	332.165	9.269087	0.511353	0.8545827	0.8225450	946.9443
20372	11.081285	190.230	332.165	11.081285	0.420676	0.7721264	0.7393880	745.0830
20448	10.071010	191.960	332.165	10.071010	0.458223	0.7976119	0.7653210	884.1786
20517	10.921845	191.960	332.165	10.921845	0.423512	0.7669440	0.7342995	874.4018
20590	9.857285	190.845	332.165	9.857285	0.489315	0.8327883	0.8005200	946.3643
20666	12.753365	190.845	332.165	12.753365	0.381058	0.7395295	0.7059682	709.0038
20745	9.532400	190.210	332.165	9.532400	0.509561	0.8542958	0.8221341	918.9077
20837	9.162833	191.765	332.165	9.162833	0.491845	0.8278405	0.7959138	840.3579

20940	10.531110	191.765	332.165	10.531110	0.457853	0.8006572	0.7681316	819.0520
21048	9.612870	189.635	332.165	9.612870	0.481180	0.8279965	0.7958570	918.0286
21173	10.006380	189.225	332.165	10.006380	0.491841	0.8428854	0.8105213	985.4151
21301	10.426695	188.645	332.165	10.426695	0.430404	0.7847575	0.7523211	913.3752
21433	8.329884	186.235	332.165	8.329884	0.490850	0.8447231	0.8131384	1014.1582
21574	11.400080	186.595	332.165	11.400080	0.417916	0.7867560	0.7538175	735.9135
21716	10.645230	186.595	332.165	10.645230	0.460863	0.8260434	0.7934012	947.6656
21866	8.680892	189.370	332.165	8.680892	0.455234	0.7973083	0.7656732	787.6282
22031	10.720585	189.080	332.165	10.720585	0.430449	0.7847587	0.7521747	931.8295
22197	9.247492	191.270	332.165	9.247492	0.408191	0.7445416	0.7127664	761.8678
22379	9.802635	187.020	332.165	9.802635	0.528548	0.8885749	0.8562043	1011.9436
22560	10.650660	184.945	332.165	10.650660	0.425217	0.7965957	0.7640194	866.9994
22748	10.275895	190.010	332.165	10.275895	0.386687	0.7333677	0.7011255	662.7292
22952	11.933450	189.400	332.165	11.933450	0.415948	0.7761284	0.7429313	846.0596
23152	12.001330	189.340	332.165	12.001330	0.425240	0.7863635	0.7531054	913.5549
23368	13.181340	190.155	332.165	13.181340	0.371450	0.7355231	0.7017279	824.1126
23577	13.330280	187.385	332.165	13.330280	0.317124	0.6929146	0.6591367	826.0180
23788	12.119755	185.560	332.165	12.119755	0.377940	0.7550355	0.7217877	800.7085
24012	13.303990	183.905	332.165	13.303990	0.263031	0.6528070	0.6191416	745.5021
24226	13.457145	185.705	332.165	13.457145	0.315264	0.6994662	0.6655987	735.4352
24450	13.995055	183.650	332.165	13.995055	0.321666	0.7196081	0.6853731	676.3398
24662	13.712425	180.570	332.165	13.712425	0.299384	0.7090268	0.6749862	769.4773
24871	12.357000	180.630	332.165	12.357000	0.344610	0.7448870	0.7115335	1018.9784
25088	9.163590	180.690	332.165	9.163590	0.477244	0.8593895	0.8273903	817.5999
25291	11.272245	181.675	332.165	11.272245	0.449034	0.8397693	0.8067728	912.9508
25501	11.086455	183.020	332.165	11.086455	0.440271	0.8234156	0.7905541	887.1705
25699	11.214125	184.960	332.165	11.214125	0.495095	0.8719874	0.8389456	1057.5442
25896	11.459530	185.530	332.165	11.459530	0.381754	0.7546397	0.7217457	919.3224
26104	11.427615	184.545	332.165	11.427615	0.426935	0.8051990	0.7722025	985.8513
26412	11.348065	184.890	332.165	11.348065	0.429776	0.8060614	0.7731046	922.0747
26614	11.676505	185.475	332.165	11.676505	0.405258	0.7804782	0.7474084	845.1954
26829	12.480595	185.935	332.165	12.480595	0.451586	0.8315608	0.7979315	942.1346
27049	11.751265	186.830	332.165	11.751265	0.415035	0.7850813	0.7519608	915.3579
27274	11.103970	192.495	332.165	11.103970	0.404285	0.7461282	0.7134391	725.9655

27506	12.480025	191.380	332.165	12.480025	0.396843	0.7516607	0.7182230	739.1994
27733	12.317240	189.300	332.165	12.317240	0.400278	0.7629827	0.7296078	656.2698
27974	12.569895	189.290	332.165	12.569895	0.371344	0.7350019	0.7015541	646.7824
28219	10.972120	191.705	332.165	10.972120	0.375762	0.7193234	0.6867650	666.4427
28821	11.616680	193.890	332.165	11.616680	0.368870	0.7072137	0.6743491	650.9694
29398	11.096930	189.520	332.165	11.096930	0.524119	0.8813315	0.8483287	891.1265
30419	10.134460	184.300	332.165	10.134460	0.448462	0.8200201	0.7876462	922.4115
31388	11.638685	189.215	332.165	11.638685	0.379583	0.7376965	0.7047480	724.9125
32106	10.132605	195.165	332.165	10.132605	0.484969	0.8126153	0.7802595	803.0811
32889	9.834265	196.700	332.165	9.834265	0.548047	0.8696230	0.8372809	837.4942
33545	10.880855	197.465	332.165	10.880855	0.429742	0.7511951	0.7186084	810.5979
34631	10.377045	199.590	332.165	10.377045	0.458898	0.7702142	0.7378363	920.6106
35945	10.751385	201.045	332.165	10.751385	0.492588	0.8011422	0.7685044	915.7998
36937	9.278780	203.510	332.165	9.278780	0.514820	0.8075576	0.7756231	783.4055
38485	9.198735	208.655	332.165	9.198735	0.498090	0.7721180	0.7403023	815.5721
39103	8.392639	205.800	332.165	8.392639	0.546192	0.8275469	0.7959731	845.8071
39681	11.449825	196.185	332.165	11.449825	0.427039	0.7566439	0.7237503	718.4413
40002	13.257680	195.075	332.165	13.257680	0.314463	0.6567855	0.6231371	704.0525
40253	9.932895	195.795	332.165	9.932895	0.546388	0.8719616	0.8395661	1015.4155
40657	8.272382	200.975	332.165	8.272382	0.500606	0.7975122	0.7660602	823.0925
41029	10.137130	201.250	332.165	10.137130	0.433944	0.7372765	0.7050933	778.8225
41327	9.530069	204.190	332.165	9.530069	0.458241	0.7485065	0.7165894	716.9845
41758	10.671990	201.120	332.165	10.671990	0.441728	0.7484400	0.7159655	724.3939
42029	11.580640	199.890	332.165	11.580640	0.409008	0.7244821	0.6915956	674.7063
42240	8.755353	200.395	332.165	8.755353	0.467121	0.7676238	0.7360225	807.2078
42495	10.413640	202.865	332.165	10.413640	0.495868	0.7960092	0.7635531	824.4340
42877	10.613855	205.305	332.165	10.613855	0.381419	0.6712183	0.6389533	688.6737
43740	11.207270	202.435	332.165	11.207270	0.507078	0.8131325	0.7802325	912.6369
44062	11.711450	204.310	332.165	11.711450	0.391607	0.6907774	0.6579016	632.0200
44404	11.324645	205.525	332.165	11.324645	0.471039	0.7654980	0.7326490	831.6049
44764	11.184635	211.365	332.165	11.184635	0.411543	0.6834419	0.6508587	660.8898
45138	13.376115	209.720	332.165	13.376115	0.323035	0.6097951	0.5761925	553.0960
45525	12.733005	216.005	332.165	12.733005	0.359366	0.6216738	0.5884075	561.3689
46322	12.018120	218.350	332.165	12.018120	0.347459	0.5984916	0.5656716	545.9594

47601	10.271700	204.025	332.165	10.271700	0.407037	0.7003206	0.6681573	676.7700
48772	10.887380	201.280	332.165	10.887380	0.429229	0.7361799	0.7036251	748.1600
50937	11.221780	207.525	332.165	11.221780	0.548830	0.8372029	0.8042388	856.4157
52168	12.206855	216.450	332.165	12.206855	0.385159	0.6440224	0.6109921	638.3958
52330	10.884445	216.450	332.165	10.884445	0.488210	0.7431811	0.7106113	722.2759
52933	10.531495	222.435	332.165	10.531495	0.539465	0.7747710	0.7423055	818.1768
53562	12.023970	222.200	332.165	12.023970	0.590746	0.8337171	0.8003341	895.9369
54360	10.969175	219.165	332.165	10.969175	0.556933	0.8046761	0.7719190	894.4191
56695	11.799285	212.440	332.165	11.799285	0.508502	0.7815149	0.7483771	758.2186
56821	9.676870	214.070	332.165	9.676870	0.529626	0.7881327	0.7560543	749.6804
58294	13.096980	223.750	332.165	13.096980	0.434754	0.6745966	0.6409971	641.7771
59004	12.654425	231.290	332.165	12.654425	0.412567	0.6269132	0.5936780	642.2636
61201	11.728895	209.260	332.165	11.728895	0.554980	0.8397785	0.8065404	939.8731
61618	10.919690	208.640	332.165	10.919690	0.486621	0.7682727	0.7356262	858.8621
63345	10.277420	198.775	332.165	10.277420	0.590586	0.9075057	0.8748583	1073.7710
65500	12.364315	208.980	332.165	12.364315	0.548204	0.8370809	0.8035031	906.7817
65984	13.201235	200.590	332.165	13.201235	0.349848	0.6705403	0.6368910	751.7876
67492	10.500190	202.450	332.165	10.500190	0.461421	0.7627627	0.7303409	803.3011
69280	11.543625	208.340	332.165	11.543625	0.466809	0.7521357	0.7192034	851.3084
69681	8.818884	213.405	332.165	8.818884	0.550936	0.8085462	0.7768226	838.4013
70083	12.575910	217.940	332.165	12.575910	0.331883	0.5864653	0.5533706	724.7573
71728	12.949905	238.510	332.165	12.949905	0.493640	0.6892157	0.6556646	769.5316
73834	12.521990	232.035	332.165	12.521990	0.527963	0.7413912	0.7079547	891.7651
74427	12.942090	236.285	332.165	12.942090	0.470405	0.6720093	0.6385041	795.4811
75975	11.813955	244.640	332.165	11.813955	0.429378	0.6035891	0.5708658	710.2587
78001	16.088725	225.785	332.165	16.088725	0.430684	0.6777472	0.6422849	812.5951
78428	14.814645	225.395	332.165	14.814645	0.523328	0.7671534	0.7322967	843.2358
80167	13.590870	232.670	332.165	13.590870	0.374170	0.5873913	0.5537187	625.9014
82264	9.319097	239.880	332.165	9.319097	0.456190	0.6361924	0.6046325	561.0331
85406	10.705515	234.690	332.165	10.705515	0.407783	0.6053911	0.5732341	584.7330
86807	10.347030	222.220	332.165	10.347030	0.383166	0.6157447	0.5837411	538.9241
89490	11.854085	228.130	332.165	11.854085	0.448199	0.6695678	0.6366665	562.1334
91816	10.817200	232.430	332.165	10.817200	0.548471	0.7549666	0.7224035	757.2943
93907	12.882770	238.210	332.165	12.882770	0.379700	0.5742670	0.5410311	507.5994

96656	12.281340	244.055	332.165	12.281340	0.353974	0.5301700	0.4973712	462.0576
99188	9.735085	243.085	332.165	9.735085	0.430647	0.6030782	0.5713991	642.8187
101967	10.836270	242.415	332.165	10.836270	0.580318	0.7595369	0.7269533	785.1310
102747	11.904570	237.070	332.165	11.904570	0.361761	0.5559666	0.5233083	554.6910
104861	14.935930	240.620	332.165	14.935930	0.484685	0.6812357	0.6465157	735.8571
107565	12.305630	238.385	332.165	12.305630	0.581557	0.7765294	0.7431285	841.6019
110928	13.266150	252.310	332.165	13.266150	0.451387	0.6100327	0.5764928	668.6916
114230	11.368895	264.240	332.165	11.368895	0.526497	0.6523217	0.6197166	682.3708
115535	12.103225	275.060	332.165	12.103225	0.650182	0.7542617	0.7210246	854.6652
117705	15.665745	274.980	332.165	15.665745	0.467457	0.5771259	0.5421980	688.7579
118737	12.090160	272.730	332.165	12.090160	0.591169	0.6998693	0.6667689	780.0163
119619	13.376815	271.165	332.165	13.376815	0.575280	0.6898210	0.6560236	778.4911
121968	14.092390	277.430	332.165	14.092390	0.481000	0.5821946	0.5482382	661.8524
124468	12.453005	278.530	332.165	12.453005	0.494356	0.5904503	0.5574137	663.6397
126463	12.412600	274.085	332.165	12.412600	0.546565	0.6525294	0.6193663	731.6617
129122	13.892880	268.440	332.165	13.892880	0.489728	0.6108842	0.5769765	688.3250
130648	11.791140	251.340	332.165	11.791140	0.615587	0.7745645	0.7414475	844.3812
131332	10.680325	241.130	332.165	10.680325	0.575380	0.7575305	0.7250306	787.6603
132984	10.841310	224.630	332.165	10.841310	0.569515	0.7997157	0.7670355	810.0015
134767	12.392455	212.430	332.165	12.392455	0.554306	0.8311426	0.7975633	848.0322
137439	11.926565	201.460	332.165	11.926565	0.407824	0.7191856	0.6861275	709.5095
138097	11.480050	198.865	332.165	11.480050	0.479383	0.7998953	0.7668837	791.4739
141499	10.685910	194.630	332.165	10.685910	0.462746	0.7950330	0.7624426	747.6862
144323	11.442350	195.305	332.165	11.442350	0.499911	0.8347591	0.8016852	825.0859
144967	12.916365	194.805	332.165	12.916365	0.467325	0.8124309	0.7786019	825.8902
148580	10.440630	198.795	332.165	10.440630	0.536004	0.8524483	0.8198473	821.1417
151686	12.964835	202.350	332.165	12.964835	0.347492	0.6599235	0.6264346	605.4743
153838	11.242885	197.540	332.165	11.242885	0.525301	0.8507400	0.8177331	840.6504
154746	10.348605	197.540	332.165	10.348605	0.466467	0.7856161	0.7532164	796.6727
155018	10.313355	196.300	332.165	10.313355	0.530626	0.8559058	0.8233603	920.7714
156122	12.884660	192.840	332.165	12.884660	0.366830	0.7173585	0.6837765	783.4878
157554	13.089500	189.190	332.165	13.089500	0.471197	0.8415285	0.8075301	935.3884
158915	13.276425	187.250	332.165	13.276425	0.467446	0.8476240	0.8135026	905.9128
160619	7.985918	187.500	332.165	7.985918	0.610210	0.9600787	0.9283861	884.0839

161695	12.010360	187.500	332.165	12.010360	0.446639	0.8163450	0.7830107	853.0225
162919	11.019520	204.300	332.165	11.019520	0.467616	0.7649254	0.7322357	911.6958
163882	11.145145	200.400	332.165	11.145145	0.443579	0.7555355	0.7228031	761.2994
164970	9.264389	196.500	332.165	9.264389	0.482802	0.8006646	0.7687527	796.1240
165836	12.244175	191.600	332.165	12.244175	0.440028	0.7935180	0.7601104	816.5971
167203	9.721515	188.400	332.165	9.721515	0.528851	0.8826170	0.8502994	919.0582
168643	12.880855	185.250	332.165	12.880855	0.491368	0.8784050	0.8444376	936.7528
169889	12.119125	196.600	332.165	12.119125	0.464273	0.7970545	0.7637069	843.2359
171139	10.251235	197.200	332.165	10.251235	0.532404	0.8538927	0.8213826	869.3297
171398	9.795615	197.200	332.165	9.795615	0.505406	0.8238574	0.7916396	830.4592
172514	11.878105	197.750	332.165	11.878105	0.582990	0.9126179	0.8791270	1036.4621
172930	9.116090	197.750	332.165	9.116090	0.597110	0.9121225	0.8800248	952.0774
174149	9.733125	197.700	332.165	9.733125	0.466567	0.7818844	0.7497935	858.3606
175288	11.109840	196.850	332.165	11.109840	0.497959	0.8247088	0.7918321	898.2530
175565	11.614275	196.850	332.165	11.614275	0.536219	0.8667717	0.8335311	922.8545
176896	10.283620	189.850	332.165	10.283620	0.549047	0.9005981	0.8679636	992.8810
177960	12.862945	190.100	332.165	12.862945	0.511227	0.8770947	0.8431407	975.2085
179446	12.538305	198.900	332.165	12.538305	0.460554	0.7865782	0.7530244	775.9448
179707	12.398400	207.700	332.165	12.398400	0.356645	0.6462695	0.6131292	617.8289
181254	12.878315	213.200	332.165	12.878315	0.378381	0.6513895	0.6179701	670.5810
181849	12.580135	215.450	332.165	12.580135	0.397286	0.6614870	0.6282100	749.5114
182354	10.924135	207.900	332.165	10.924135	0.337109	0.6182801	0.5859830	533.0327
183523	10.255550	198.900	332.165	10.255550	0.364258	0.6753709	0.6432735	722.3501
184818	7.416540	199.700	332.165	7.416540	0.499713	0.7973521	0.7662723	764.1696
186603	11.920440	207.050	332.165	11.920440	0.368120	0.6578749	0.6249659	666.7498
189340	10.674150	221.000	332.165	10.674150	0.464490	0.7035425	0.6711718	669.7611
190307	8.493256	231.350	332.165	8.493256	0.506649	0.7081319	0.6767842	855.7630
191709	10.294565	225.850	332.165	10.294565	0.442095	0.6644477	0.6323565	754.8232
192795	10.022120	219.150	332.165	10.022120	0.479334	0.7219167	0.6898251	713.9450
194581	10.191110	226.500	332.165	10.191110	0.496187	0.7171053	0.6849425	715.4765
194846	11.431140	226.500	332.165	11.431140	0.441957	0.6665568	0.6338857	683.5466
195710	11.487825	223.250	332.165	11.487825	0.478354	0.7138228	0.6810104	733.1355