

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	0.3761916	0.3433725
-56	12.86272	368.020	332.165	12.86272	0.471798	0.4222576	0.3894927
-50	11.88472	364.900	332.165	11.88472	0.506921	0.4619285	0.4295967
-43	13.09339	353.835	332.165	13.09339	0.566461	0.5350491	0.5018830
-38	12.20387	346.520	332.165	12.20387	0.528049	0.5071935	0.4745842

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)

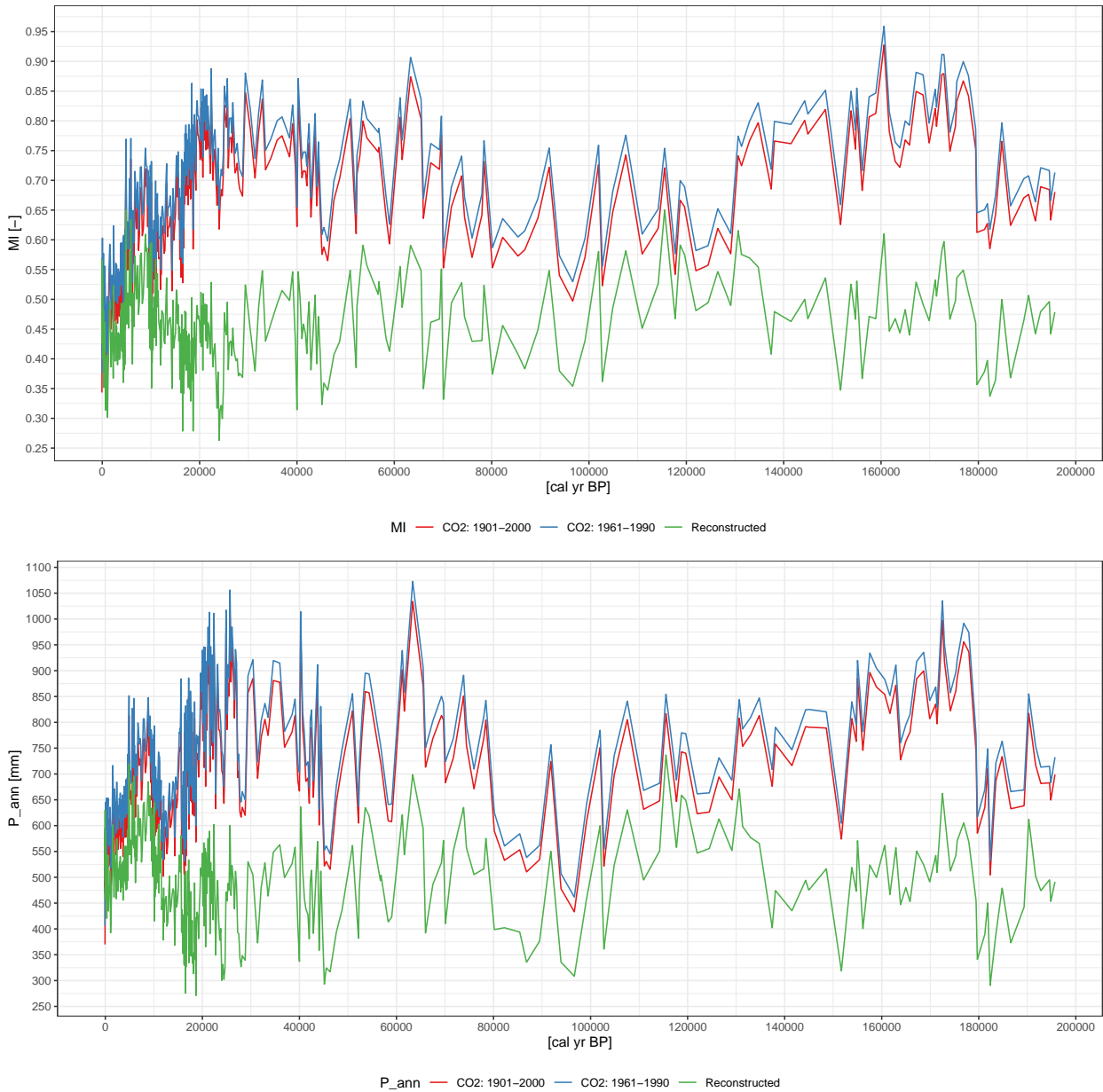
# Small subset
knitr::kable(head(padul2, 13),
              col.names = c("age cal yr BP",
                           "past temp",
                           "past co2",
                           "modern co2",
                           "present temp",
                           "recon. MI",
                           "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	0.3761916	0.3433725	405.3445	369.9821
-56	12.86272	368.020	332.165	12.86272	0.471798	0.4222576	0.3894927	453.4250	418.2416
-50	11.88472	364.900	332.165	11.88472	0.506921	0.4619285	0.4295967	519.9328	483.5410
-43	13.09339	353.835	332.165	13.09339	0.566461	0.5350491	0.5018830	595.2649	558.3662
-38	12.20387	346.520	332.165	12.20387	0.528049	0.5071935	0.4745842	531.5279	497.3541
-31	11.87980	337.155	332.165	11.87980	0.522880	0.5154825	0.4830260	514.0037	481.6404
-25	11.49567	331.960	332.165	11.49567	0.562884	0.5631914	0.5308230	577.1140	543.9454
-19	12.52563	325.080	332.165	12.52563	0.438233	0.4491507	0.4165062	506.4300	469.6224
-13	12.88969	318.840	332.165	12.88969	0.468382	0.4894679	0.4565260	563.6046	525.6732
-6	13.13016	315.340	332.165	13.13016	0.483879	0.5109222	0.4777937	580.9149	543.2481
-1	12.70126	312.000	332.165	12.70126	0.493117	0.5256401	0.4927156	586.3366	549.6103
6	12.72497	311.290	332.165	12.72497	0.490124	0.5238704	0.4909372	559.3670	524.2023
12	11.81530	311.730	332.165	11.81530	0.524648	0.5572286	0.5247071	580.7053	546.8136

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

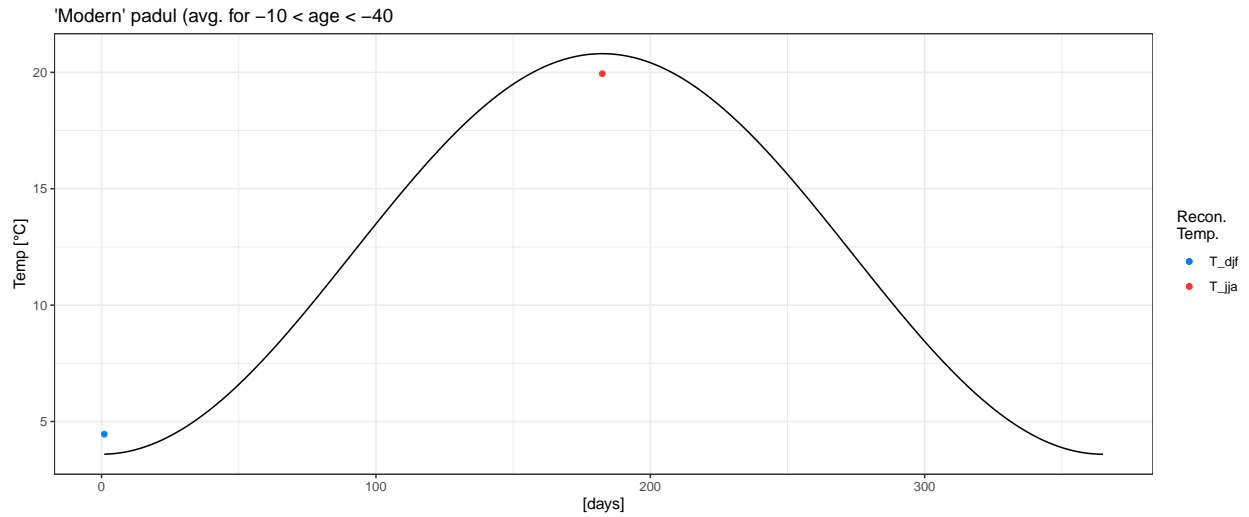


New corrections

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

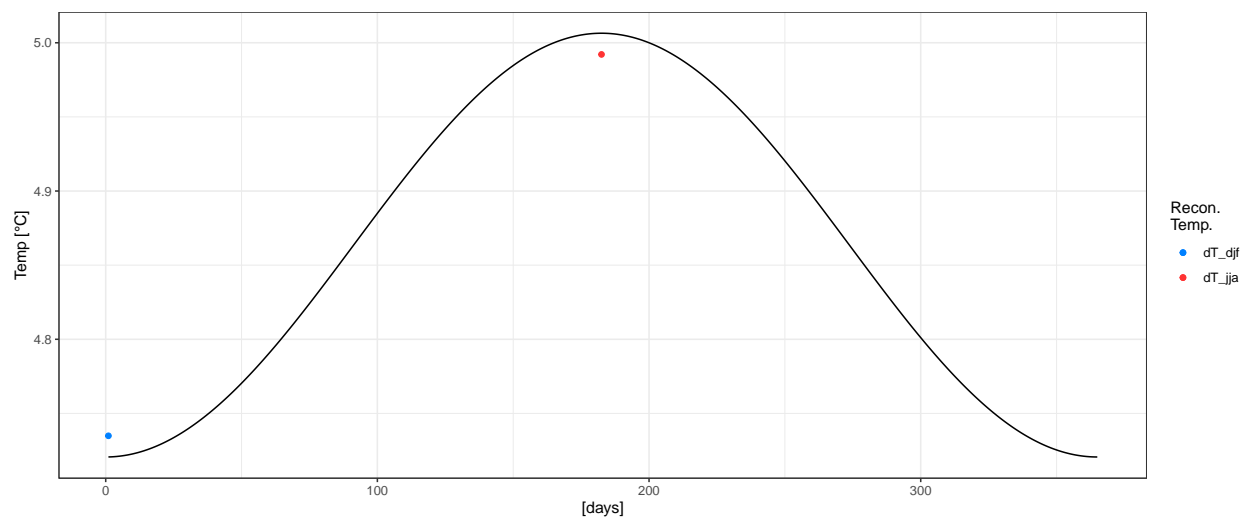
$$T_{\text{mean}} = (T_{\text{jja}} + T_{\text{djf}}) / 2$$

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

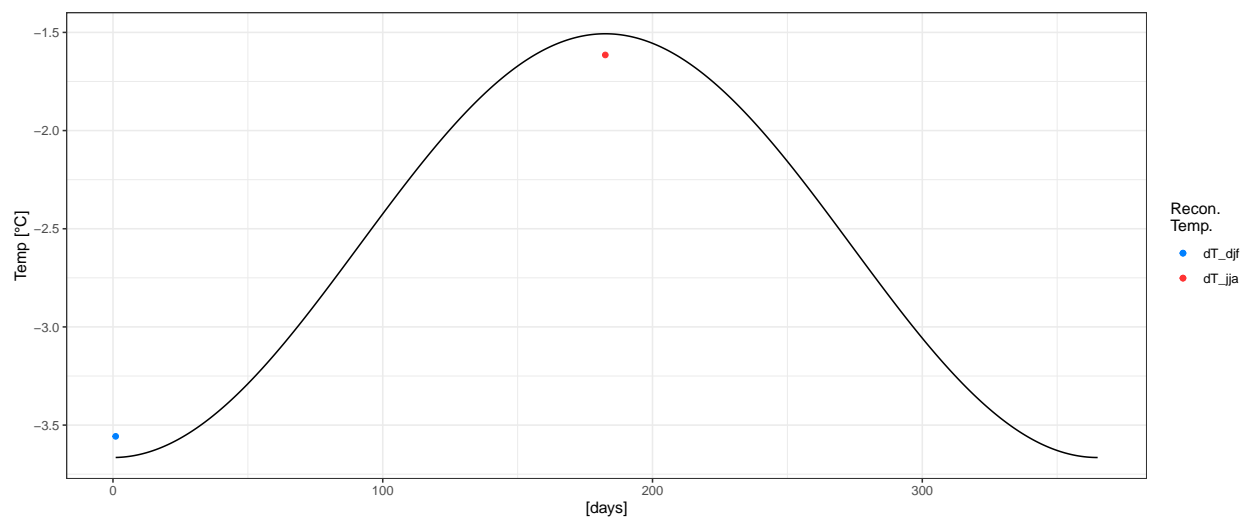
$$T_{\text{min}} = T_{\text{mean}} + (T_{\text{djf}} - T_{\text{mean}}) / 0.9$$

```
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

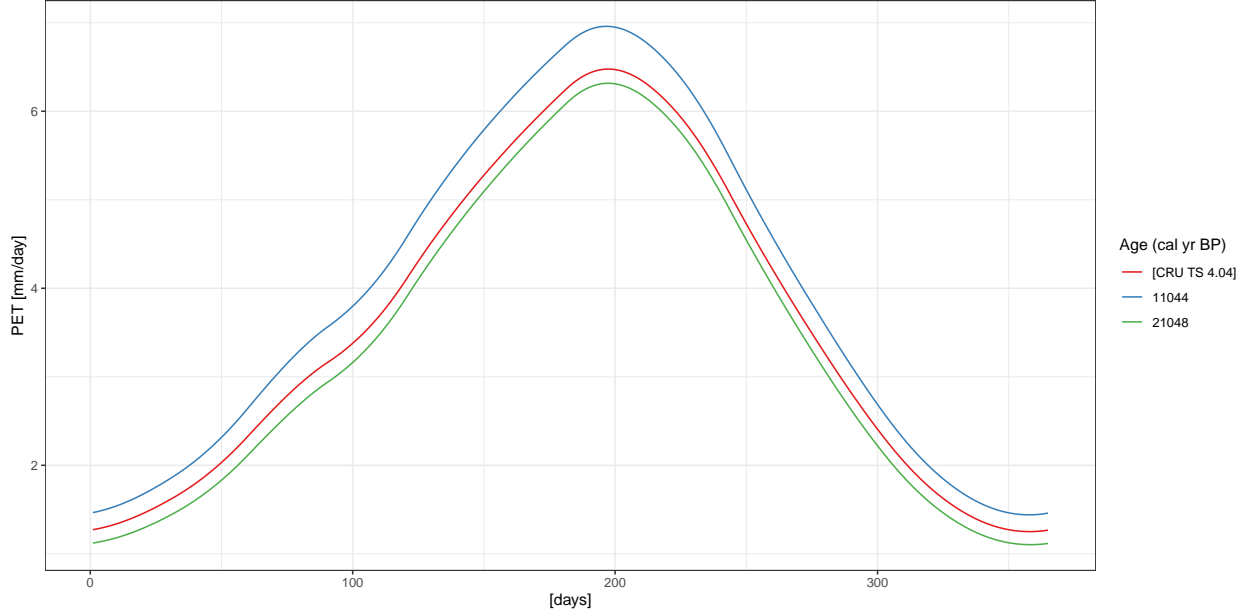


Calculate potential evapotranspiration (PET)

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).

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

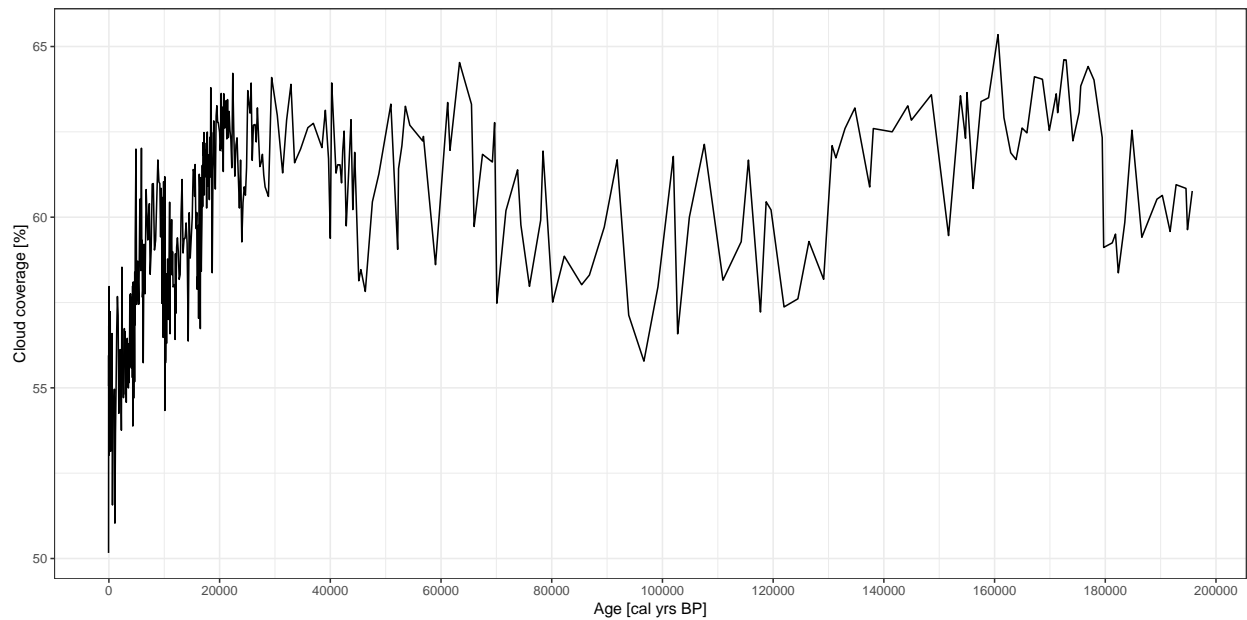
age_cal_yr_BP	MI	P_ann	corr_mi	corr_P_ann (MI ratio)	corr_P_ann (Tmp anomalies)
-62	0.425809	458.807	0.3761916	405.3445	500.1025
-56	0.471798	506.622	0.4222576	453.4250	557.3249
-50	0.506921	570.575	0.4619285	519.9328	596.9559
-43	0.566461	630.212	0.5350491	595.2649	707.8200
-38	0.528049	553.384	0.5071935	531.5279	660.6681
-31	0.522880	521.380	0.5154825	514.0037	667.2316
-25	0.562884	576.799	0.5631914	577.1140	722.1806
-19	0.438233	494.120	0.4491507	506.4300	588.2578

age_cal_yr_BP	MI	P_ann	corr_mi	corr_P_ann (MI ratio)	corr_P_ann (Tmp anomalies)
-13	0.468382	539.325	0.4894679	563.6046	646.7892
-6	0.483879	550.167	0.5109222	580.9149	678.1978
-1	0.493117	550.058	0.5256401	586.3366	691.7613
6	0.490124	523.334	0.5238704	559.3670	689.8594
12	0.524648	546.752	0.5572286	580.7053	720.8259
18	0.528909	540.303	0.5674820	579.7070	733.5542
24	0.429877	459.993	0.4751270	508.4131	637.1969
4679	0.477212	581.116	0.5959943	725.7610	811.8197
4693	0.481918	551.825	0.6019183	689.2326	842.5425
4707	0.448255	542.514	0.5641050	682.7249	763.1980
4723	0.462332	582.651	0.5789264	729.5884	787.3378
4756	0.535625	621.786	0.6536780	758.8290	895.8604
4890	0.650277	719.723	0.7692824	851.4375	1054.4936
11499	0.513904	551.458	0.6407364	687.5588	890.8089
11594	0.462316	437.416	0.6024811	570.0319	827.6663
11888	0.445394	459.323	0.6049536	623.8726	836.6727
11954	0.389403	378.477	0.5500744	534.6402	740.2232
12022	0.465376	479.259	0.6384501	657.4962	874.7996
12091	0.417931	412.517	0.5755301	568.0745	782.2446
21433	0.490850	589.305	0.8436960	1012.9251	1008.2748
21574	0.417916	390.909	0.7856977	734.9235	1009.8167
21716	0.460863	528.718	0.8249945	946.4623	1041.5655
21866	0.455234	449.707	0.7963147	786.6467	962.4699
22031	0.430449	511.119	0.7837391	930.6189	990.5822
22197	0.408191	417.690	0.7435643	760.8678	910.5058
184818	0.499713	478.917	0.7964845	763.3381	932.3021
186603	0.368120	373.086	0.6570428	665.9064	854.3176
189340	0.464490	442.187	0.7028561	669.1077	890.5259
190307	0.506649	612.275	0.7075483	855.0577	850.1055
191709	0.442095	502.227	0.6638069	754.0953	831.9680
192795	0.479334	474.041	0.7212185	713.2545	898.0810
194581	0.496187	495.060	0.7164708	714.8435	896.9298
194846	0.441957	453.222	0.6659136	682.8870	856.1608
195710	0.478354	491.296	0.7131504	732.4449	917.3584

Calculate cloud coverage from corrected MI

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

Padul: cloud coverage

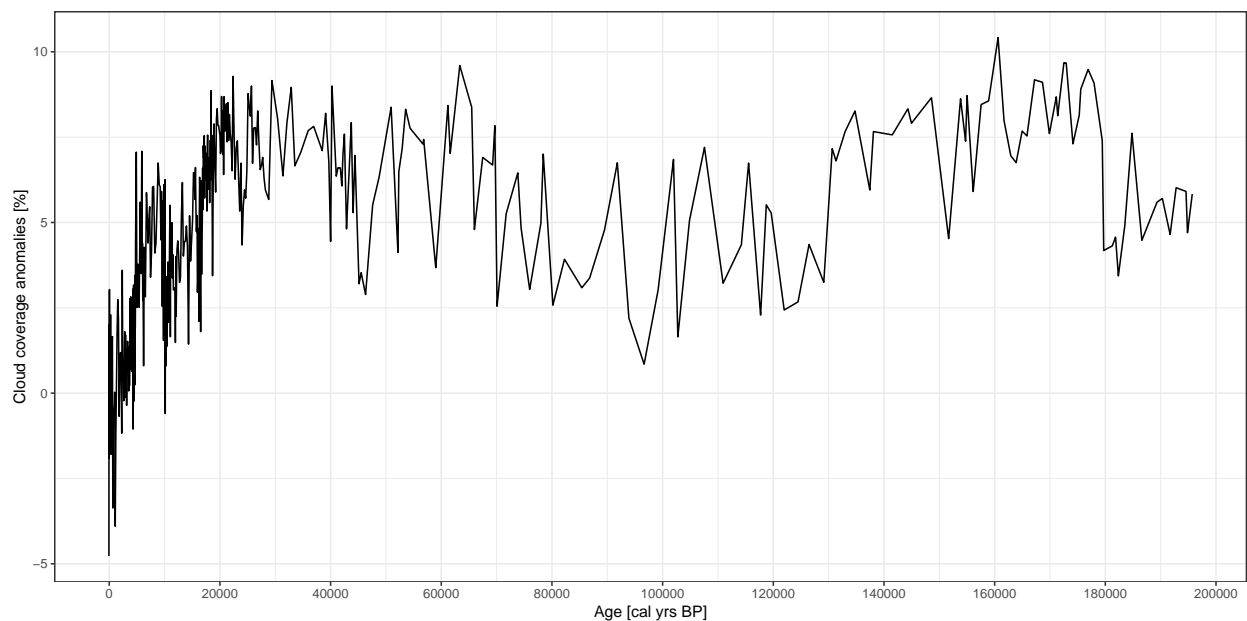


Calculate cloud coverage anomalies

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)
```

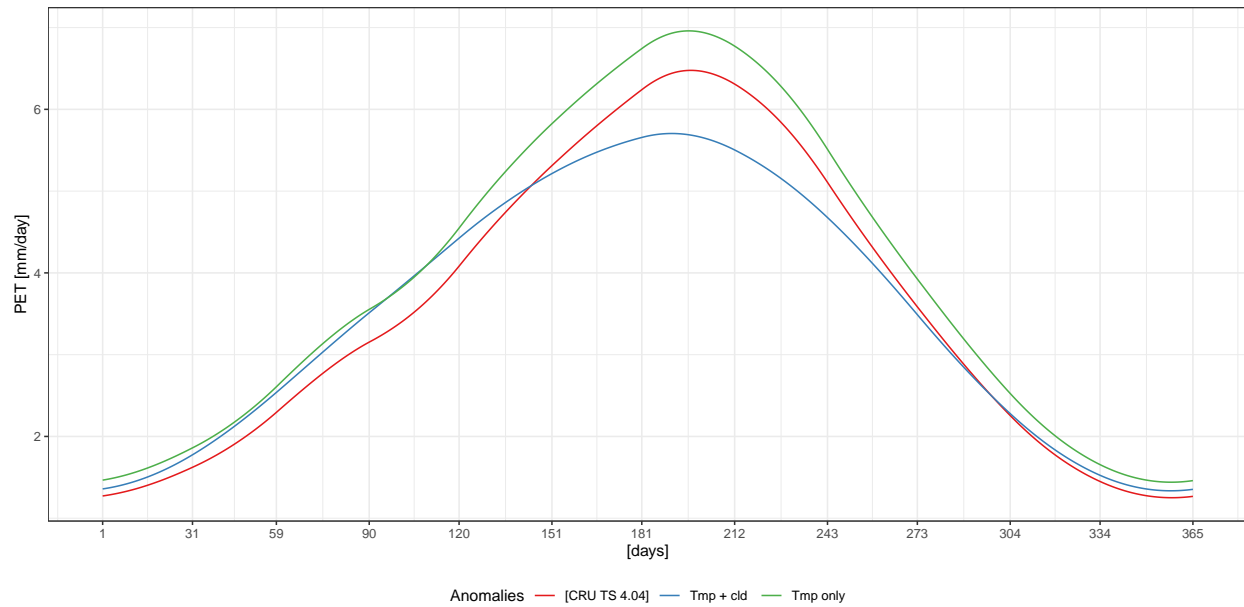
Padul: cloud coverage anomalies



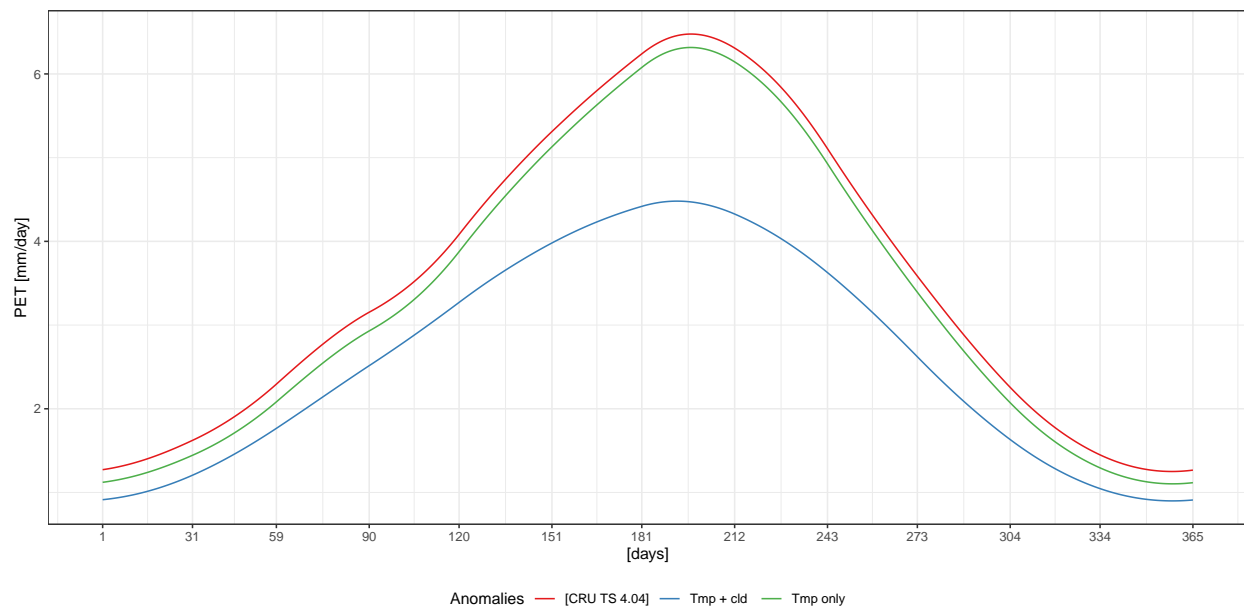
Re-calculate potential evapotranspiration (PET)

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
```

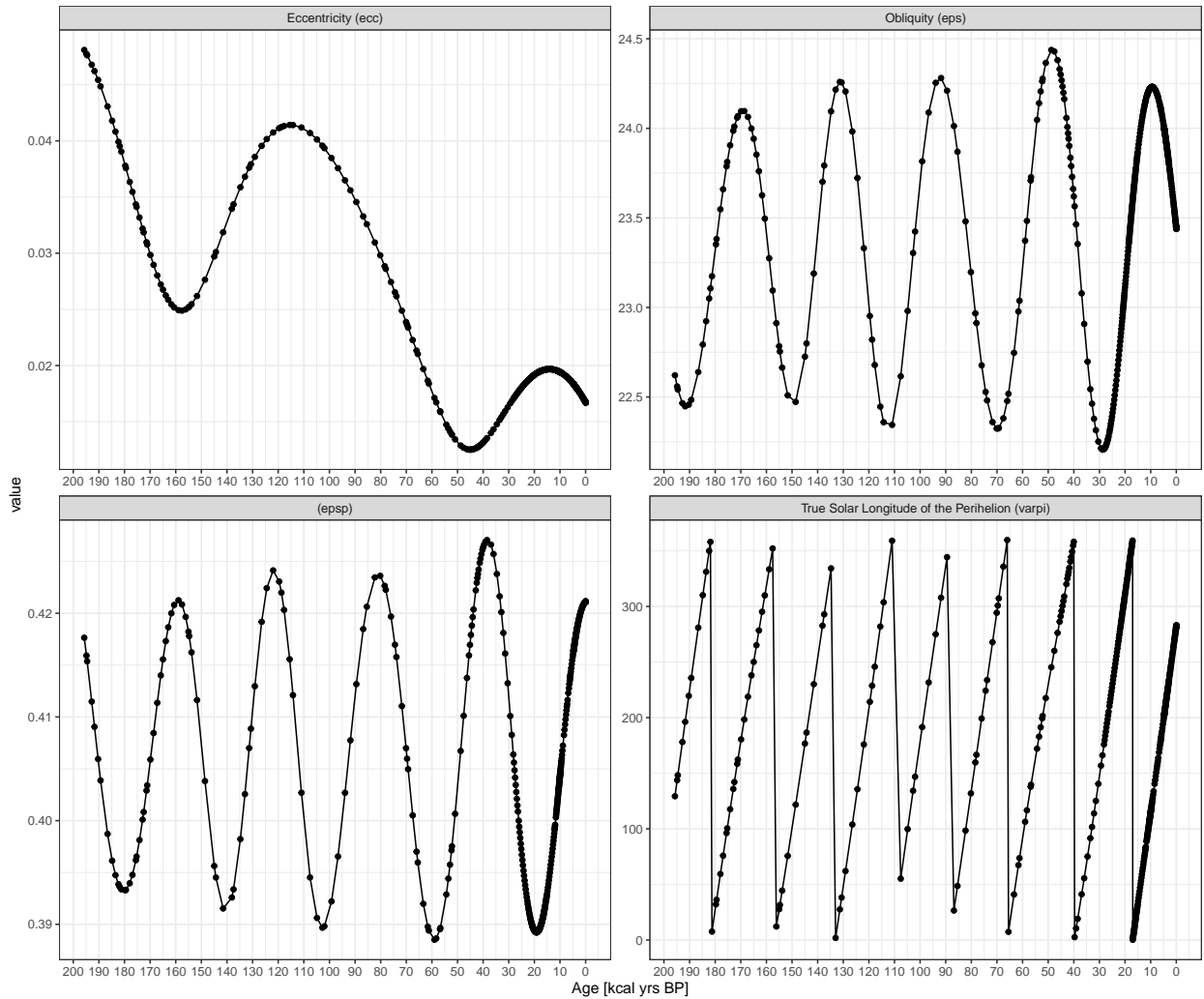
age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corr_mi	corr_mi_20th	corr_P_ann
-62	13.159180	368.020	332.165	13.159180	0.425809	0.3761916	0.3433725	503.5919
-56	12.862720	368.020	332.165	12.862720	0.471798	0.4222576	0.3894927	542.6911
-50	11.884725	364.900	332.165	11.884725	0.506921	0.4619285	0.4295967	565.3190
-43	13.093390	353.835	332.165	13.093390	0.566461	0.5350491	0.5018830	639.3333
-38	12.203865	346.520	332.165	12.203865	0.528049	0.5071935	0.4745842	607.0933
10536	16.278340	267.200	332.165	16.278340	0.464915	0.5940792	0.5587991	730.5757
10612	16.047825	267.200	332.165	16.047825	0.503634	0.6325775	0.5973544	758.8179
10690	16.485350	266.450	332.165	16.485350	0.448163	0.5795441	0.5441607	722.0581
10762	16.975485	266.000	332.165	16.975485	0.435743	0.5694244	0.5337283	720.6073
10835	17.668380	265.550	332.165	17.668380	0.473725	0.6108398	0.5745413	763.4466
10904	15.477845	266.350	332.165	15.477845	0.524962	0.6547501	0.6198459	767.0814
10972	15.780770	266.200	332.165	15.780770	0.567718	0.6990384	0.6638247	805.4926
11044	17.062450	266.200	332.165	17.062450	0.422194	0.5554798	0.5197586	710.2698
11113	14.071460	264.800	332.165	14.071460	0.541849	0.6721239	0.6380542	759.2593
11187	16.074465	265.150	332.165	16.074465	0.490152	0.6240747	0.5888553	751.7929
11258	17.405490	264.400	332.165	17.405490	0.513015	0.6527113	0.6164945	794.0688
21048	9.612870	189.635	332.165	9.612870	0.481180	0.8269962	0.7949494	789.8320
21173	10.006380	189.225	332.165	10.006380	0.491841	0.8418758	0.8096048	804.1794
21301	10.426695	188.645	332.165	10.426695	0.430404	0.7837362	0.7513932	775.5367
21433	8.329884	186.235	332.165	8.329884	0.490850	0.8436960	0.8122030	774.0149
21574	11.400080	186.595	332.165	11.400080	0.417916	0.7856977	0.7528536	795.3886
21716	10.645230	186.595	332.165	10.645230	0.460863	0.8249945	0.7924460	806.1331
21866	8.680892	189.370	332.165	8.680892	0.455234	0.7963147	0.7647715	754.1301
22031	10.720585	189.080	332.165	10.720585	0.430449	0.7837391	0.7512490	781.0643
22197	9.247492	191.270	332.165	9.247492	0.408191	0.7435643	0.7118814	731.3718

PET with orbital parameters

Find orbital parameters

Selected samples and their orbital parameters:

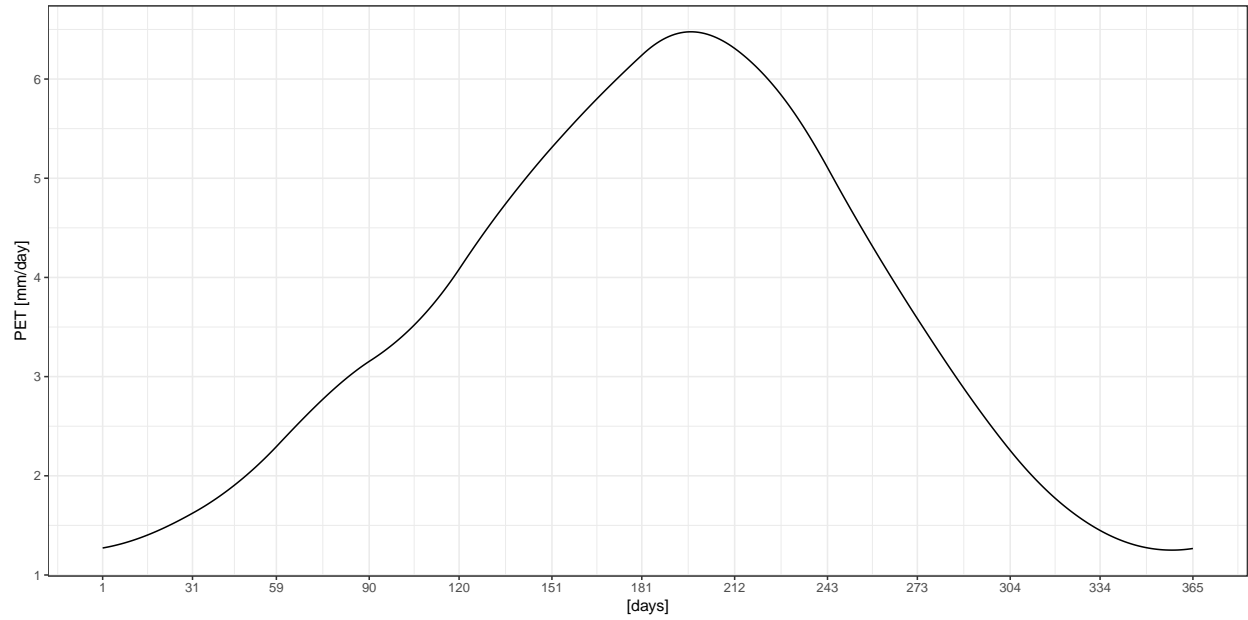
year	eps	ecc	varpi	epsp
-62	23.43821	0.0166988	283.10107	0.4211302
-56	23.43899	0.0167012	282.99828	0.4211293
-50	23.43977	0.0167037	282.89549	0.4211284
-43	23.44068	0.0167065	282.77558	0.4211273
6007	24.10588	0.0186835	180.75324	0.4138745
11044	24.19953	0.0195329	97.68662	0.4016794
21048	22.94125	0.0189846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



Plots

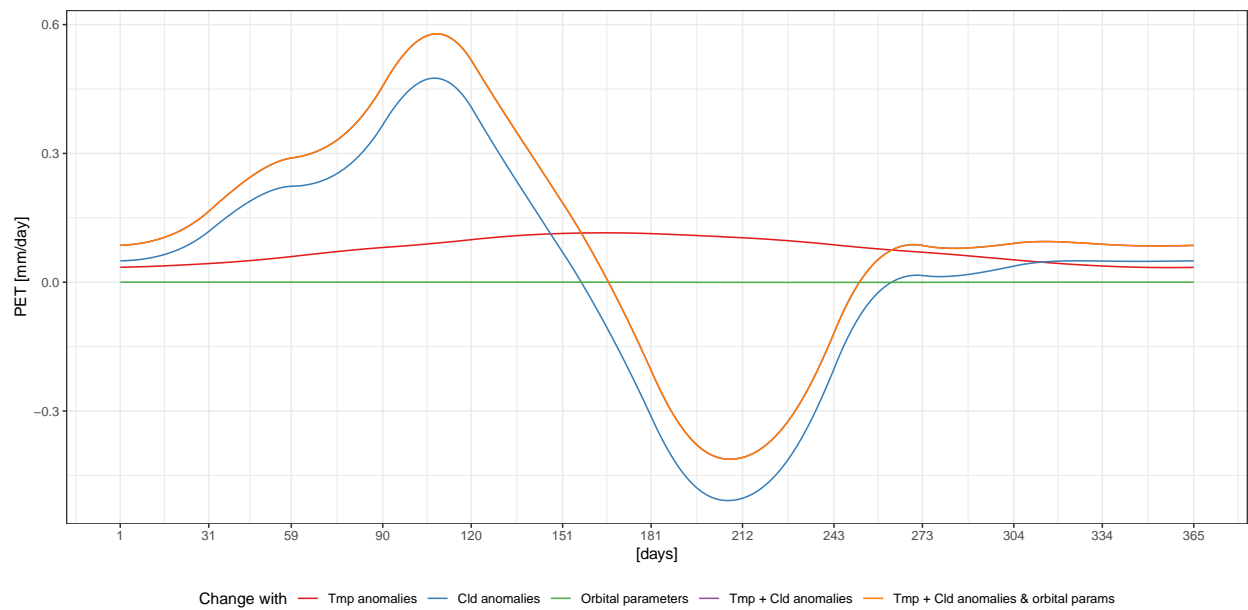
Modern PET

Obtained from CRU TS 4.04

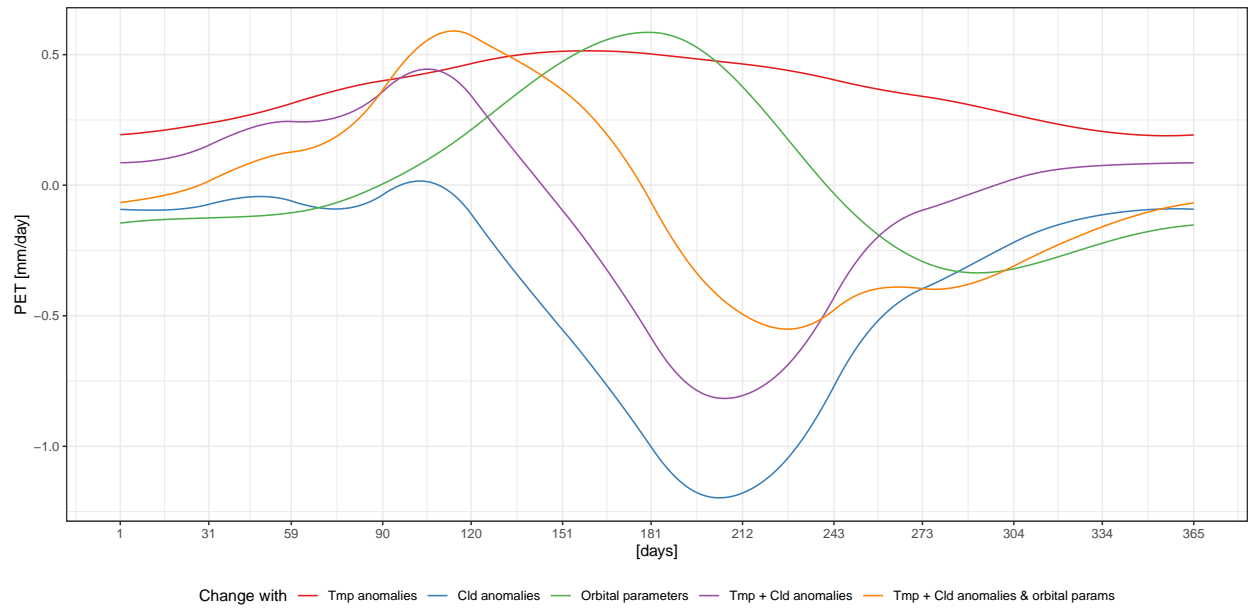


PET changes

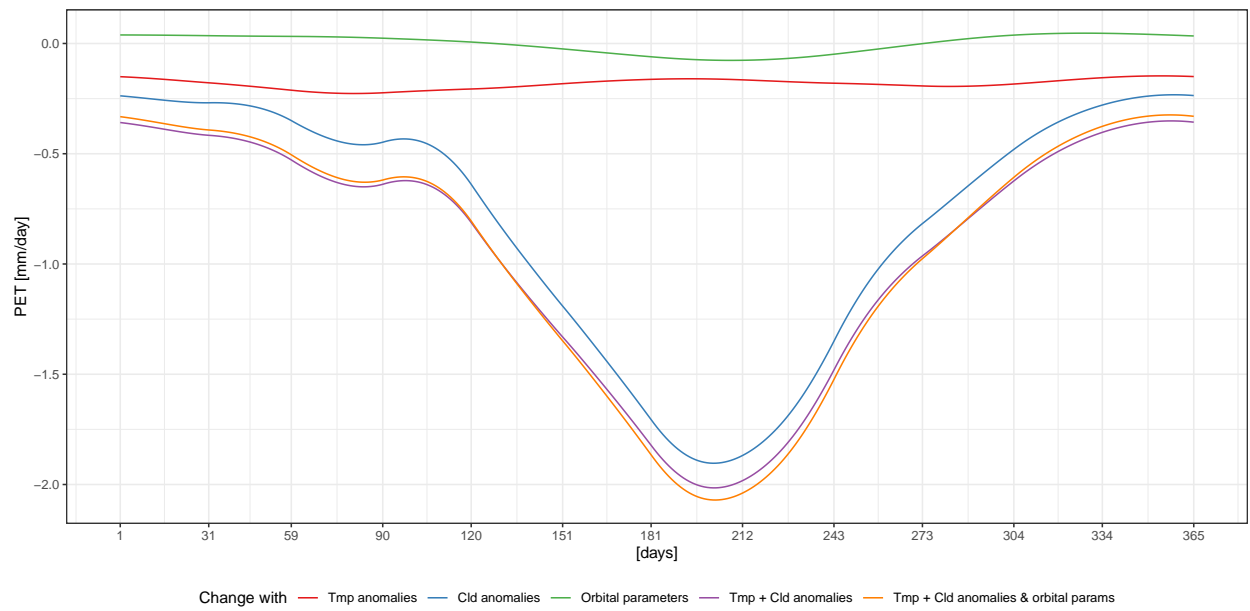
Padul: PET for age = -62 cal yr BP



Padul: PET for age = 11044 cal yr BP



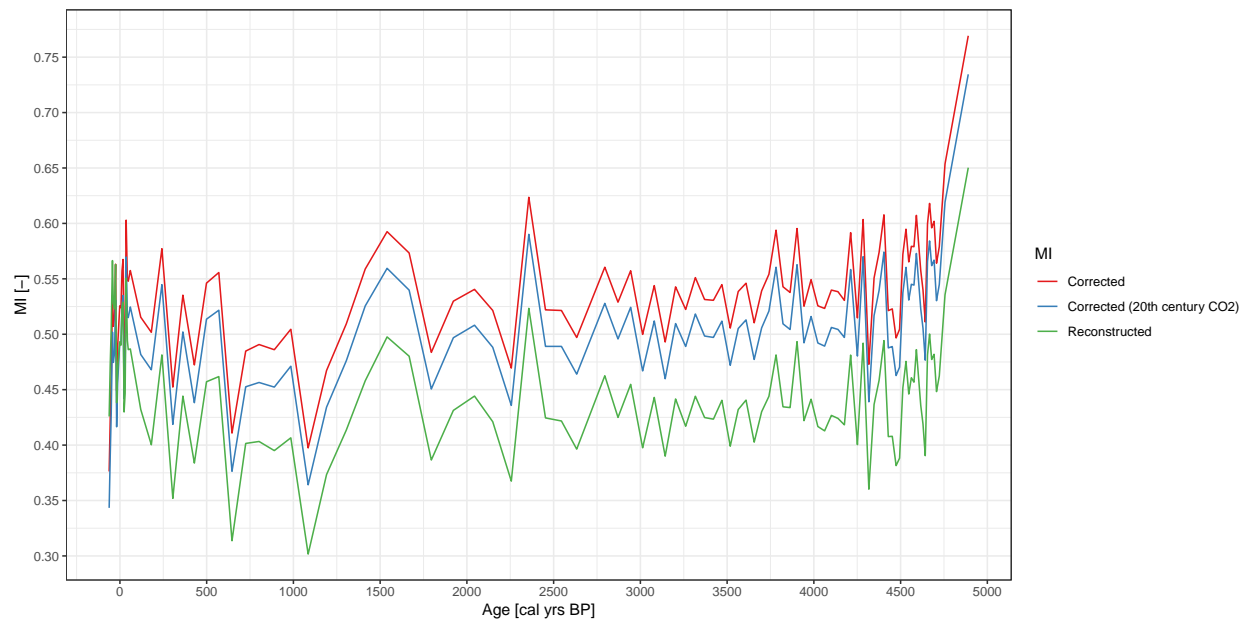
Padul: PET for age = 21048 cal yr BP



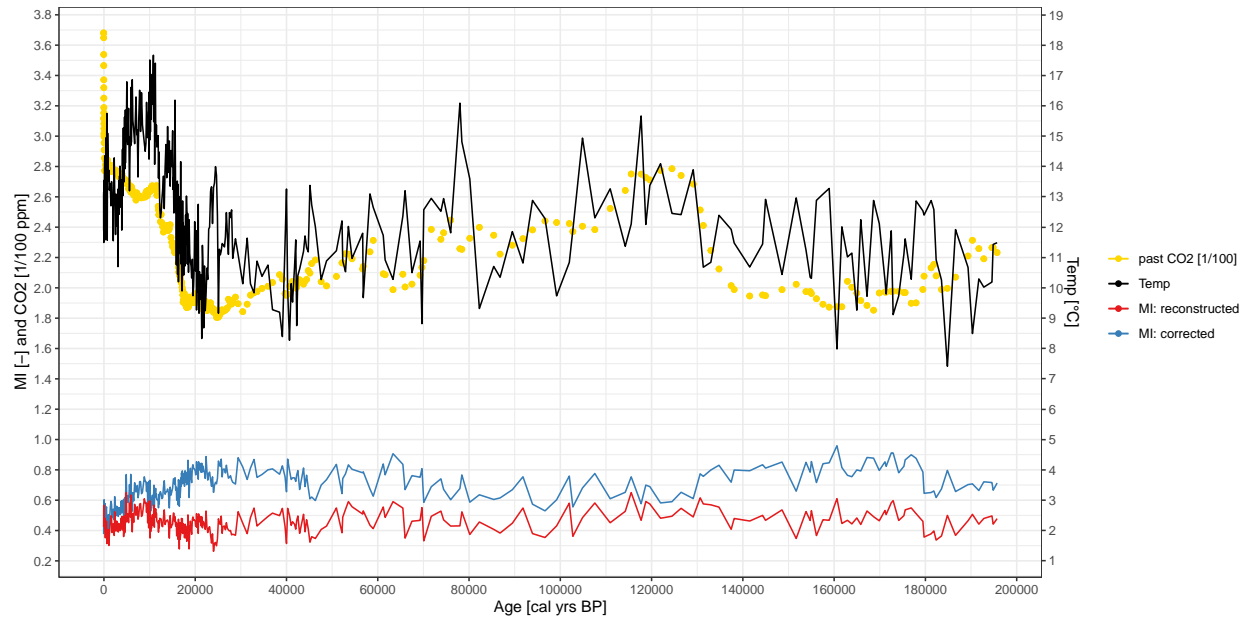
Reconstructed vs corrected MI: Past CO2 calculated using mean



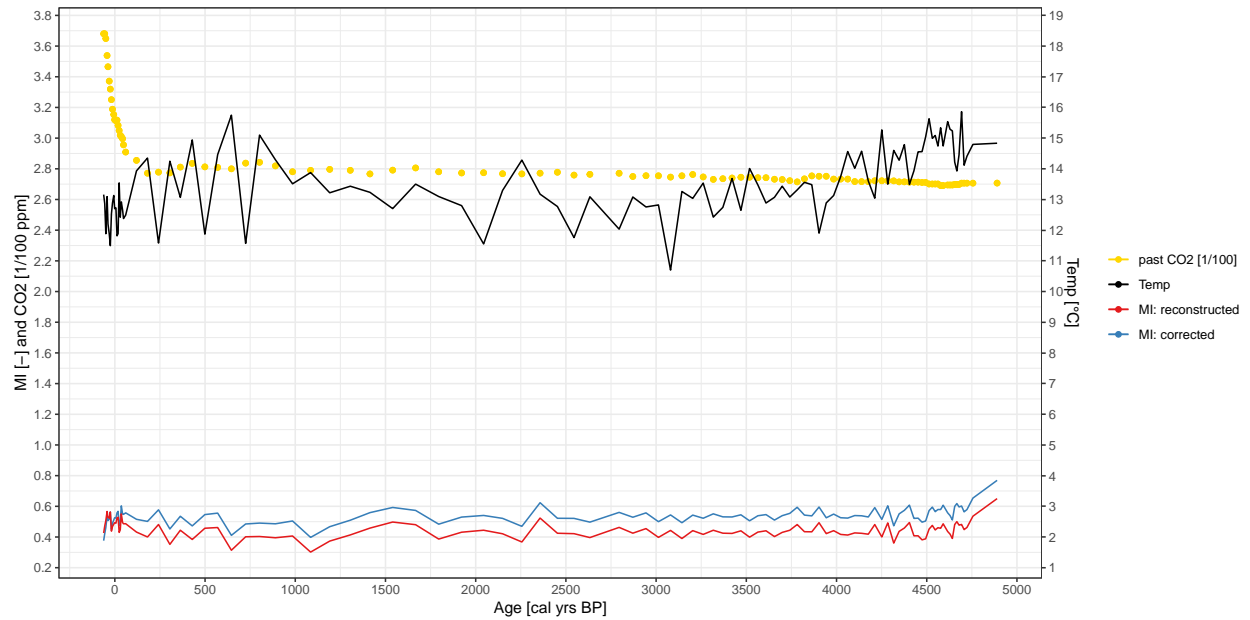
- age < 5k



Include past CO2 and Temperature

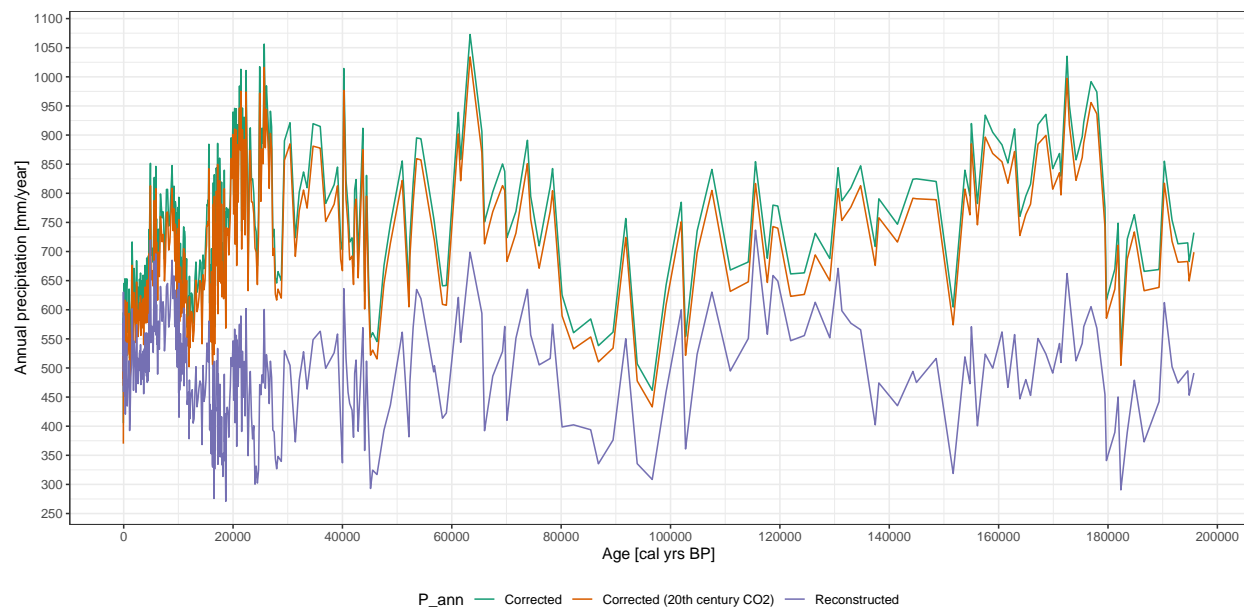


- age < 5k

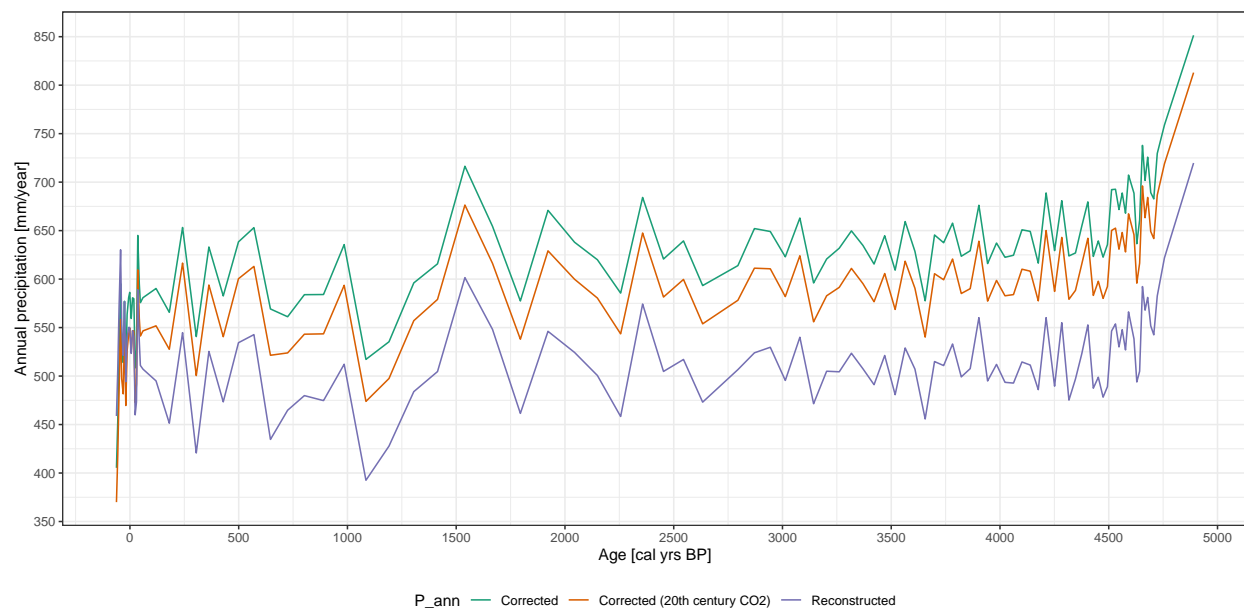


Reconstructed vs corrected P_{ann}: Past CO₂ calculated using mean

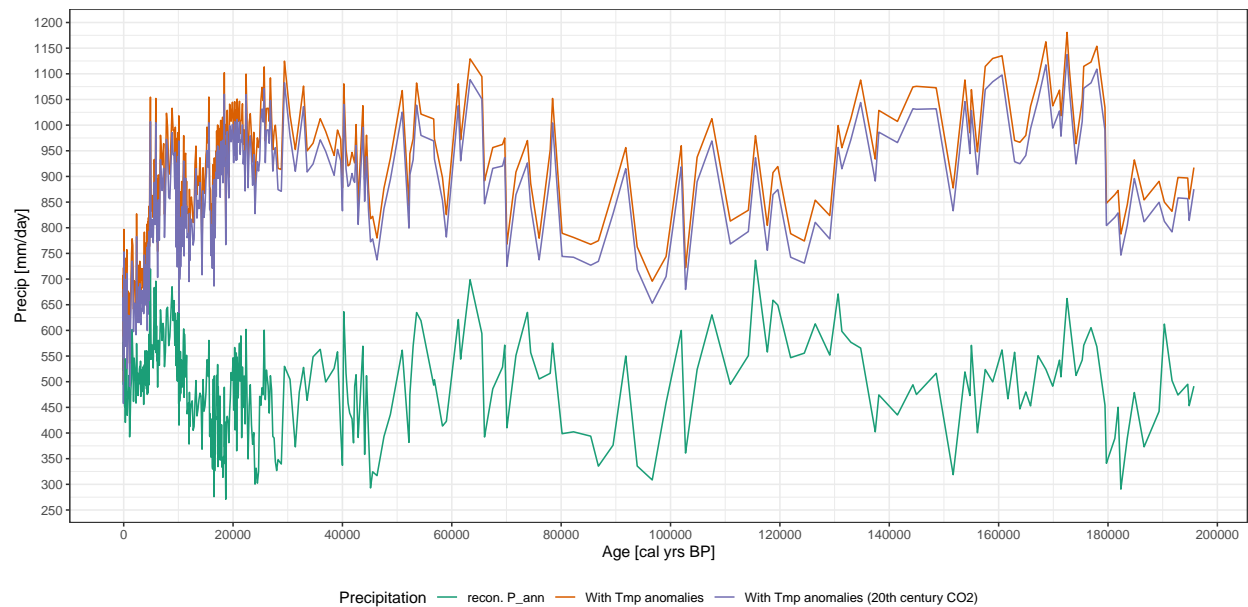
With MI ratio



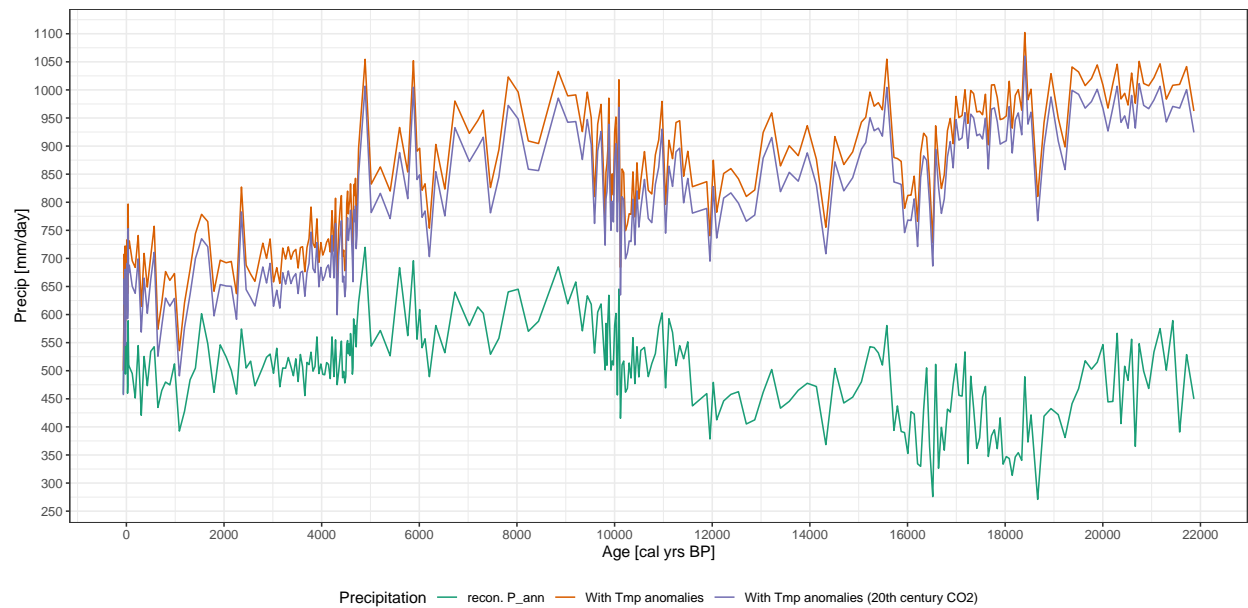
- age < 5k



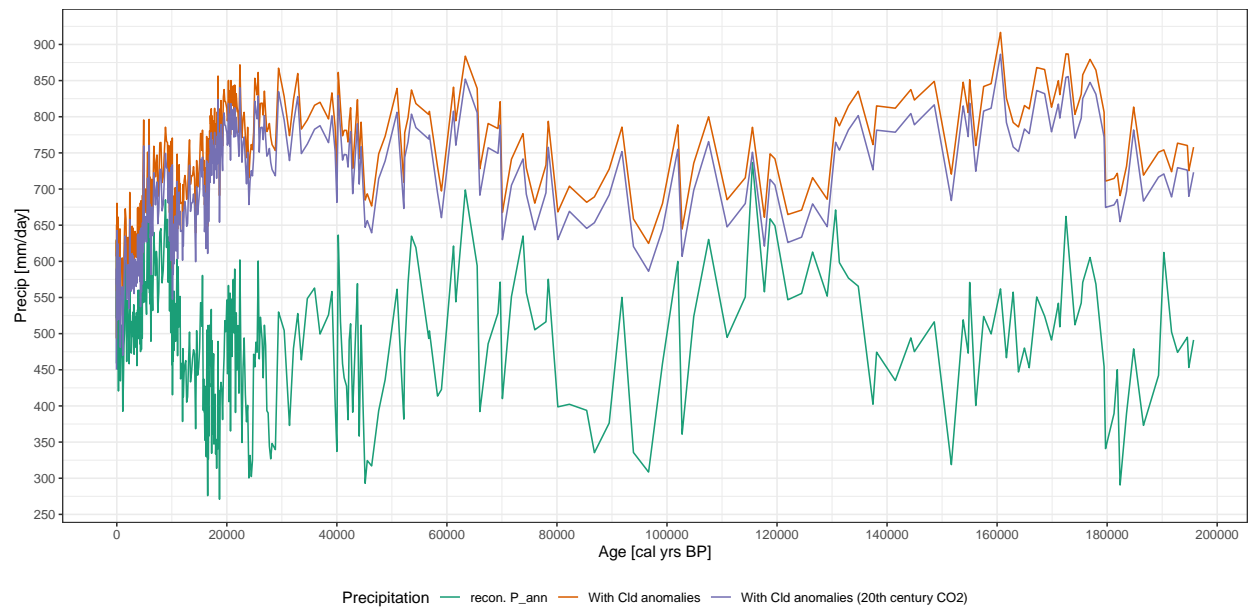
With temperature anomalies



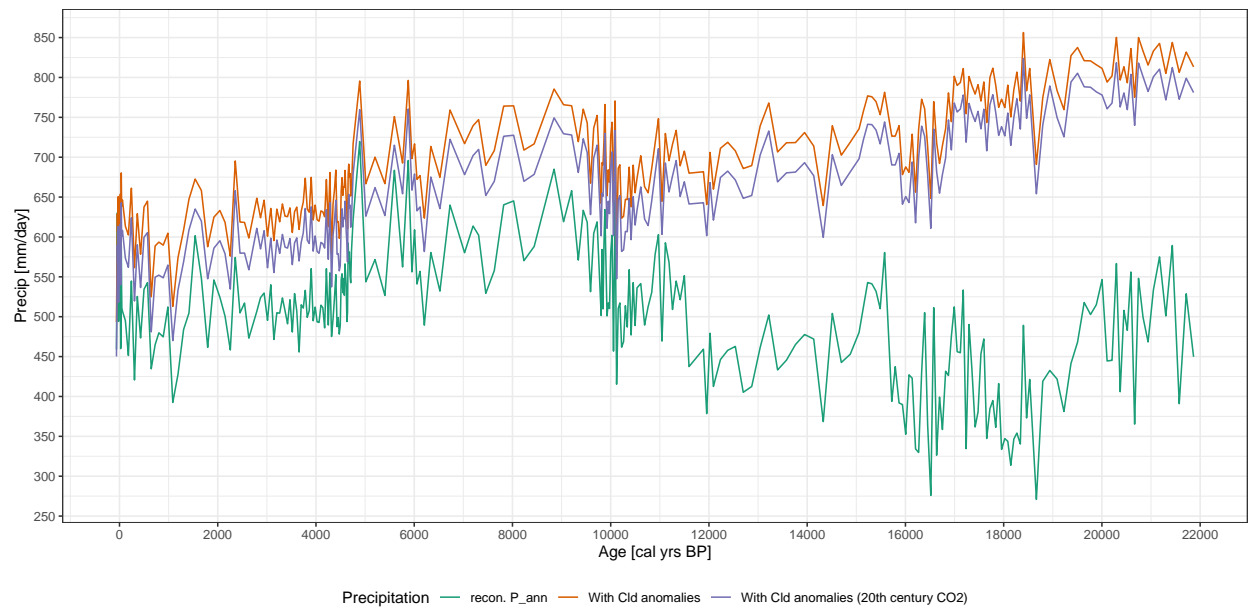
age < 22k



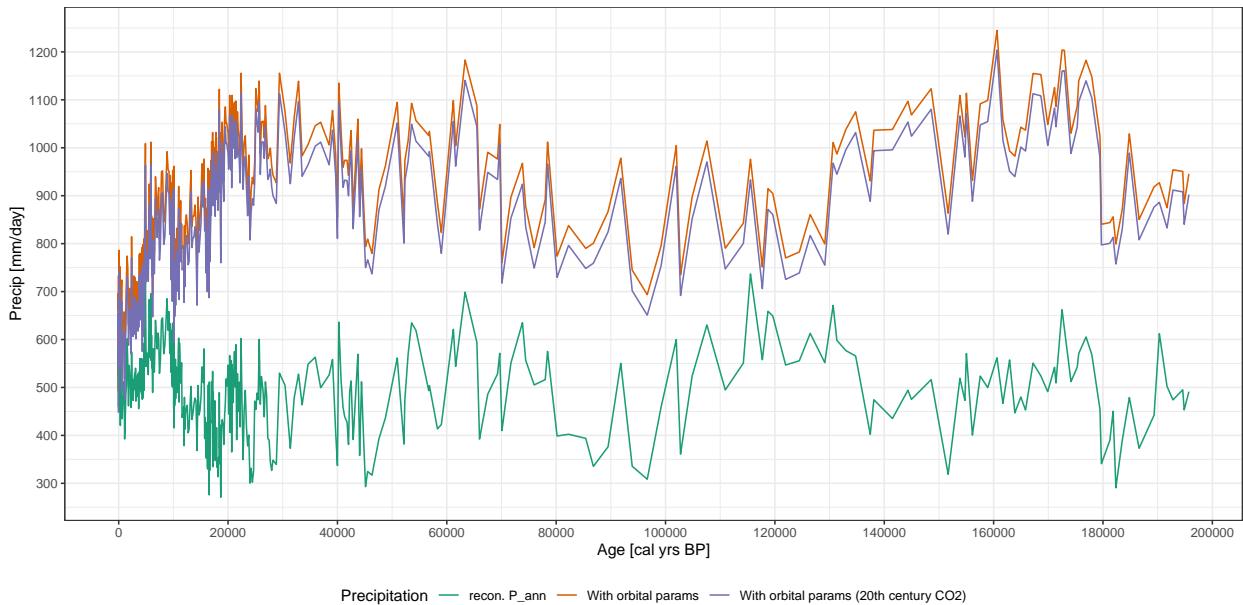
With cloud coverage anomalies



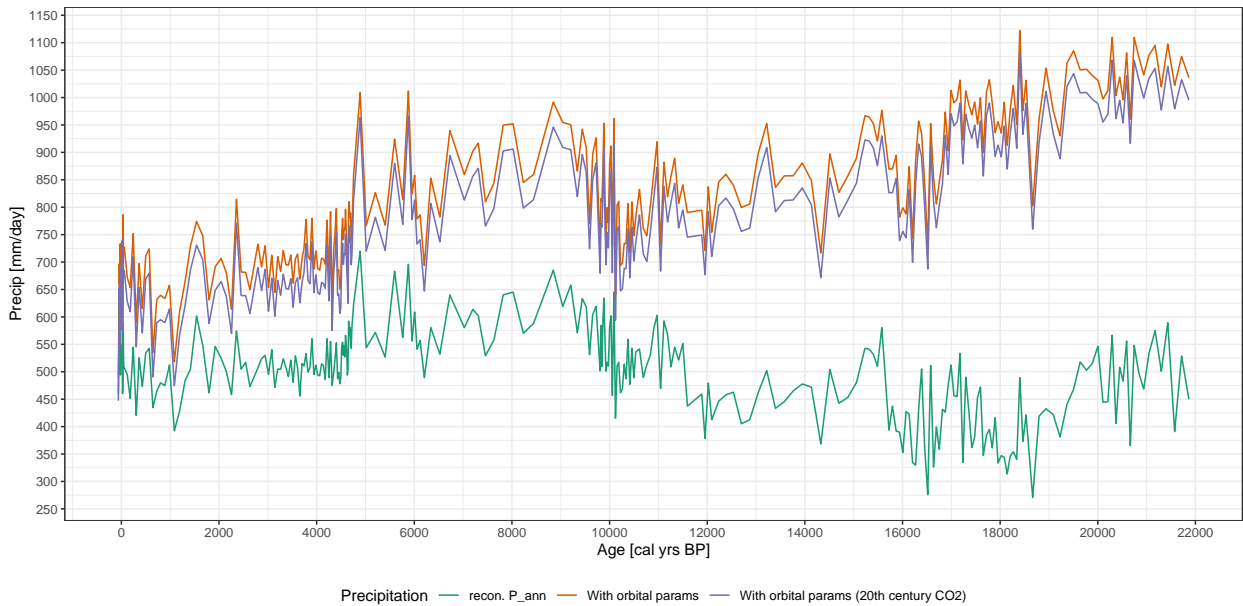
age < 22k



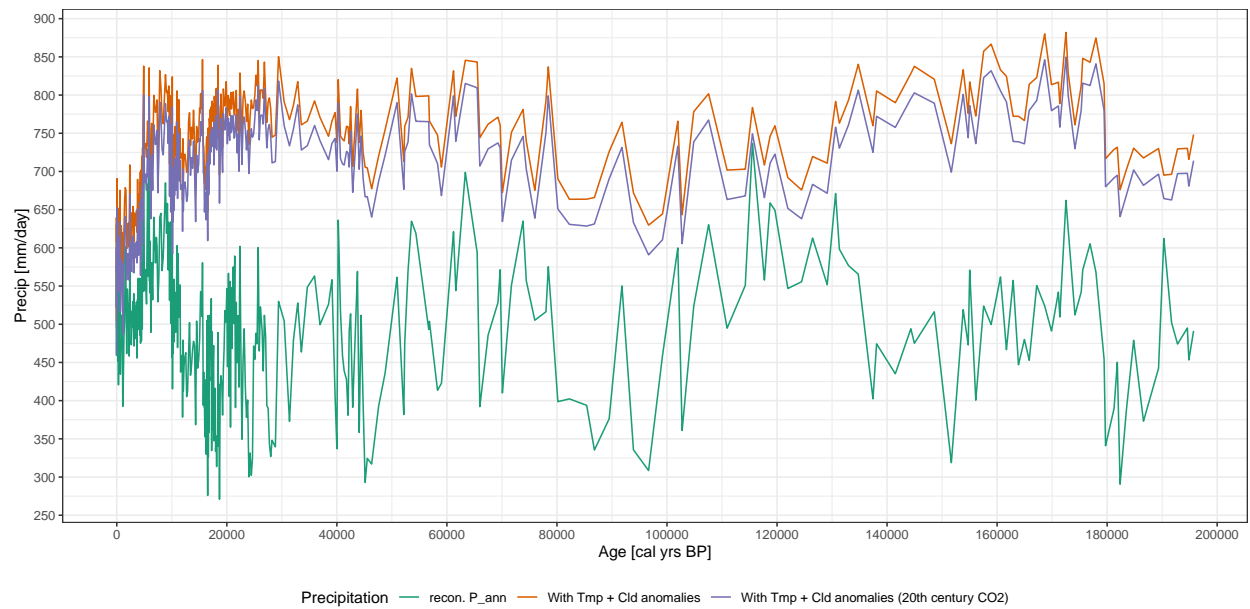
With orbital parameters



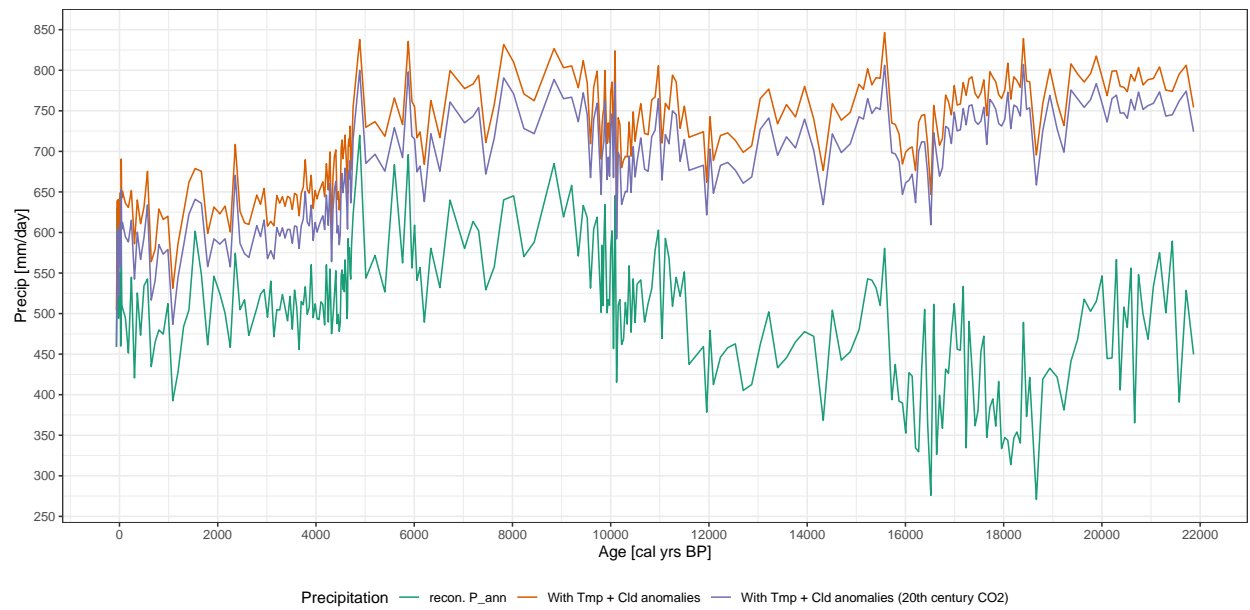
age < 22k



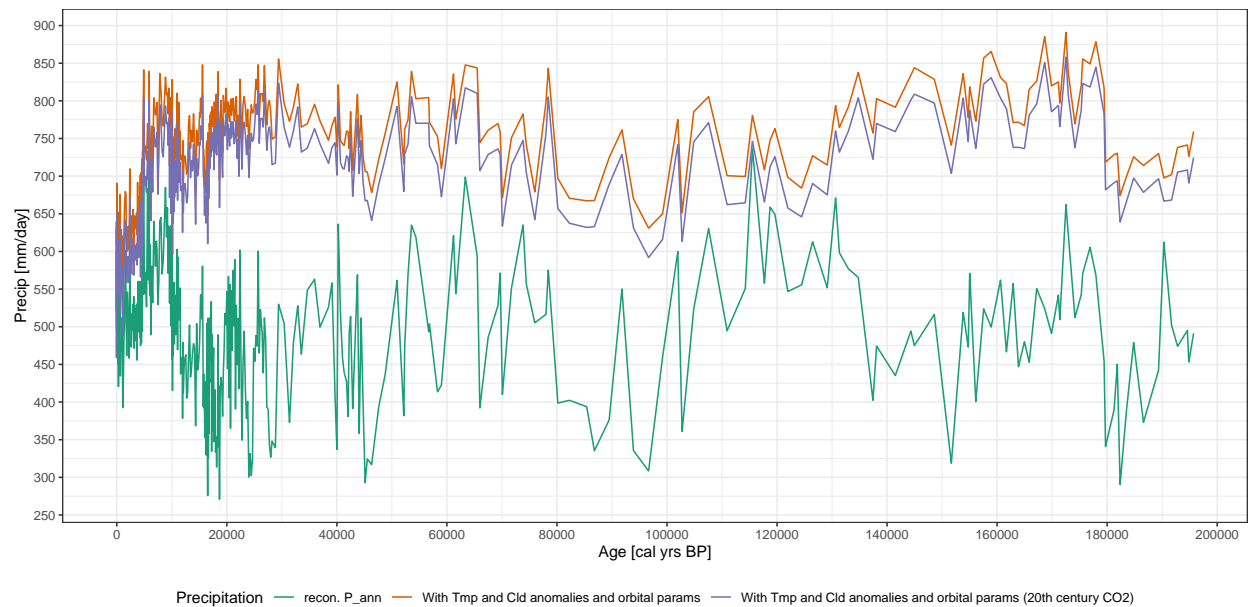
With temperature and cloud coverage anomalies



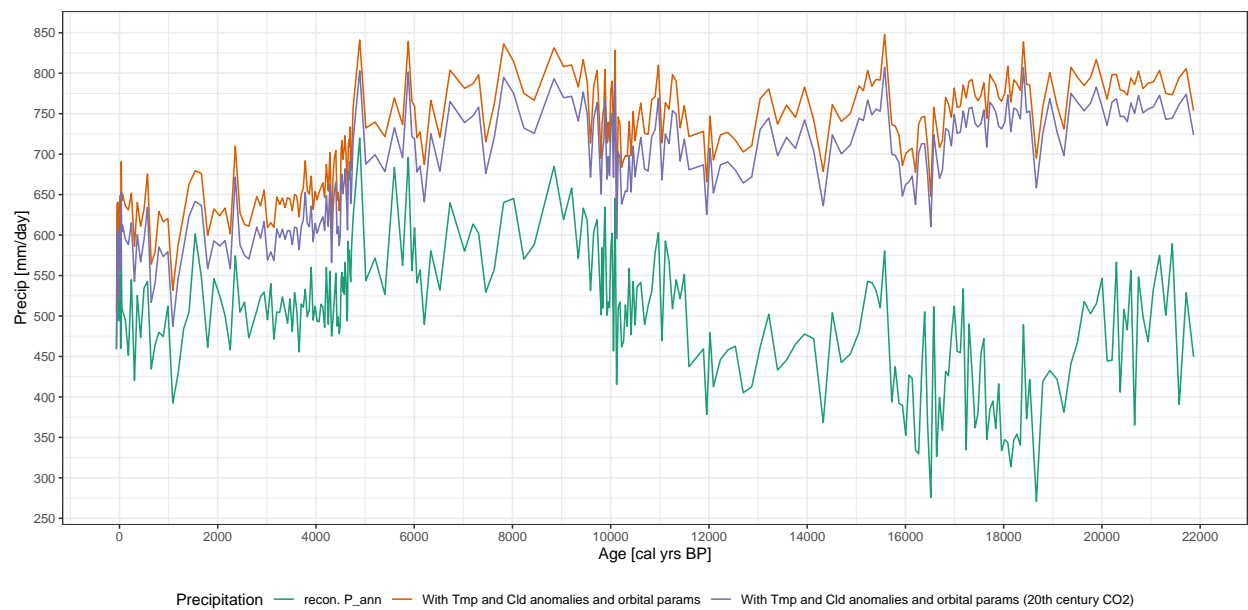
age < 22k



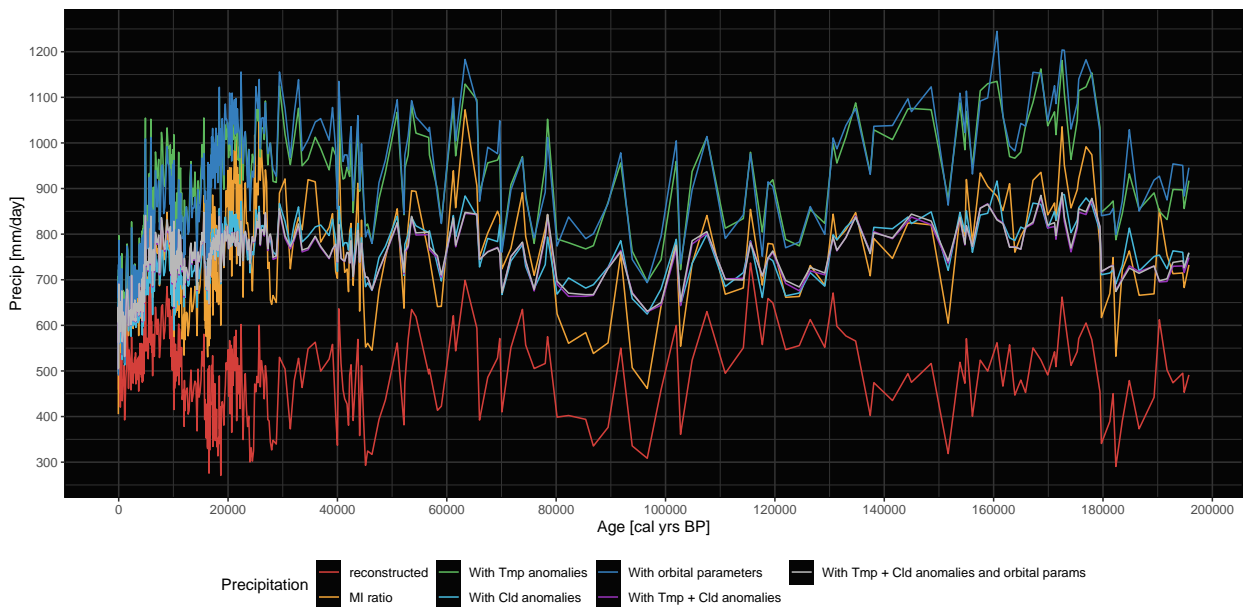
With temperature and cloud coverage anomalies and orbital parameters



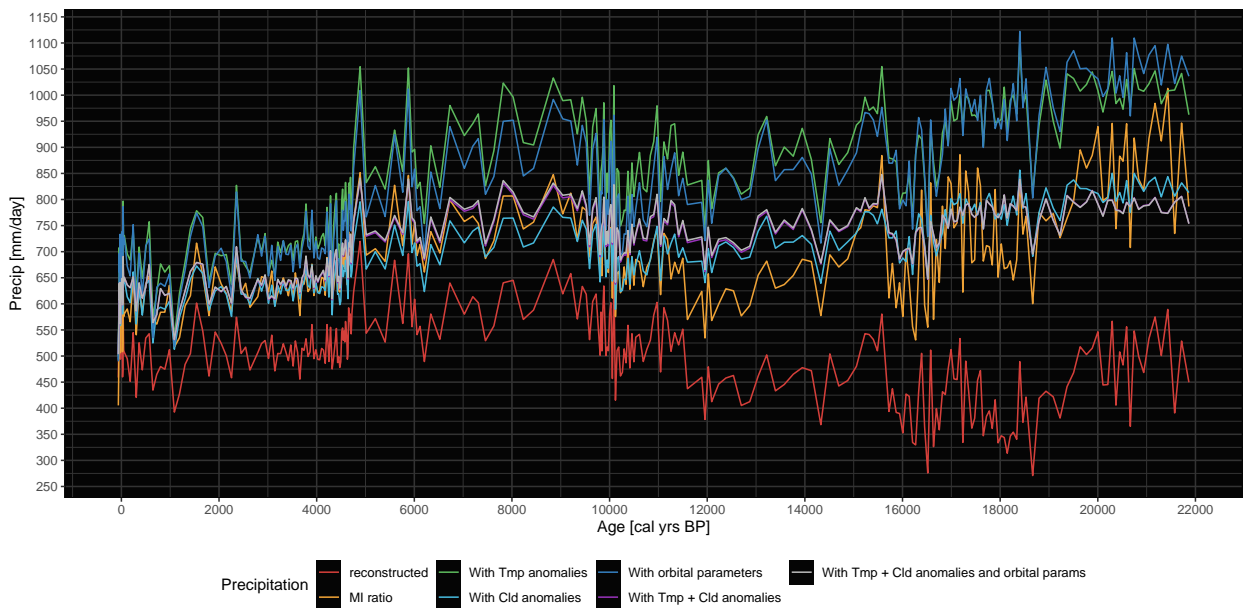
age < 22k



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.

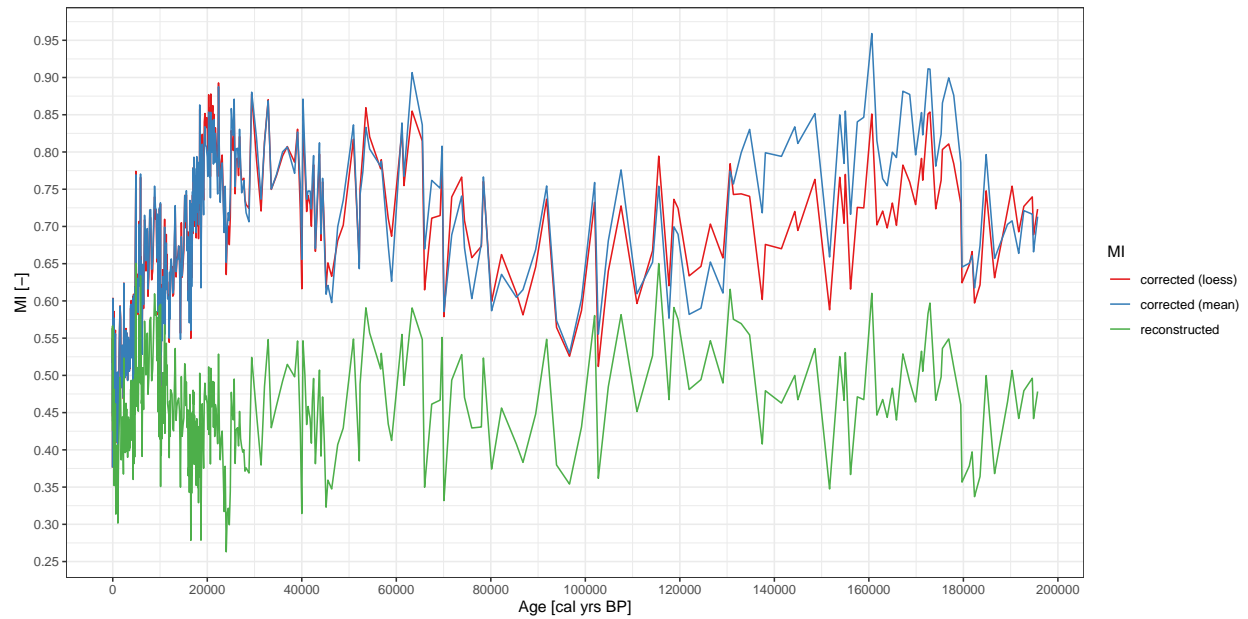
Appendix

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$corr_mi_loess <- codos::corrected_mi(padul2$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	0.3433725	369.9821	368.0200
-56	12.86272	332.165	12.86272	0.471798	0.3894927	418.2416	368.0200
-50	11.88472	332.165	11.88472	0.506921	0.4295967	483.5410	348.5771
-43	13.09339	332.165	13.09339	0.566461	0.5018830	558.3662	343.4588
-38	12.20387	332.165	12.20387	0.528049	0.4745842	497.3541	339.9523
-31	11.87980	332.165	11.87980	0.522880	0.4830260	481.6404	335.2524
-25	11.49567	332.165	11.49567	0.562884	0.5308230	543.9454	331.4182
-19	12.52563	332.165	12.52563	0.438233	0.4165062	469.6224	327.7633
-13	12.88969	332.165	12.88969	0.468382	0.4565260	525.6732	324.2577
-6	13.13016	332.165	13.13016	0.483879	0.4777937	543.2481	320.3318

A2. Plot reconstructed vs corrected MI both approaches

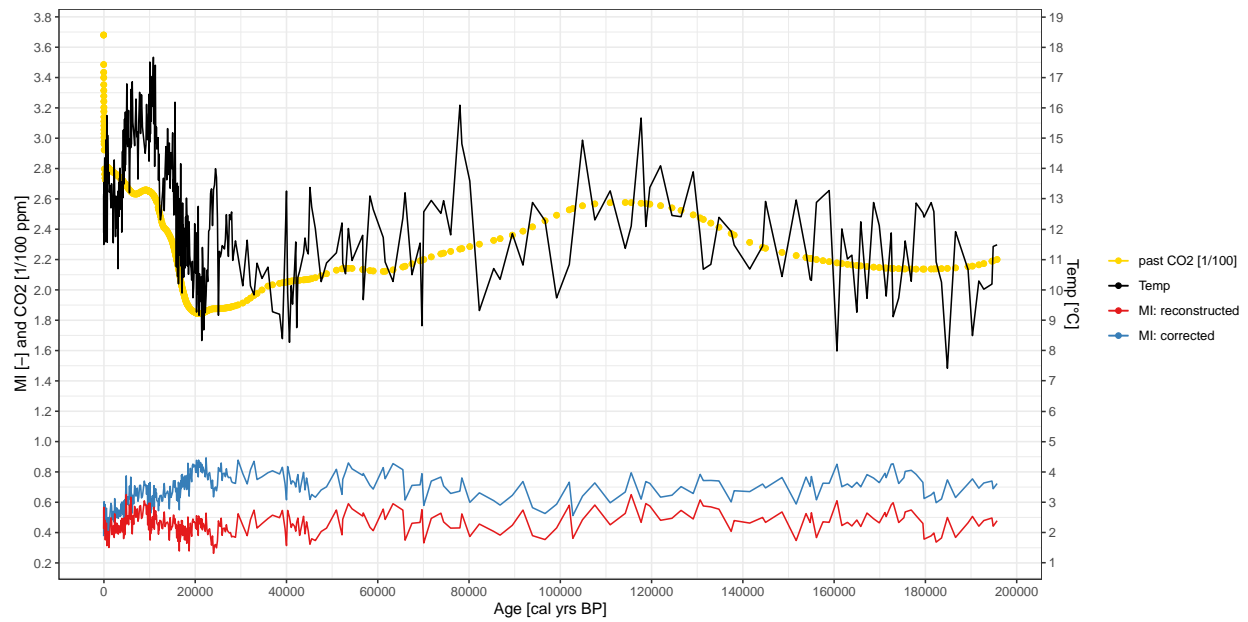


- age < 5k

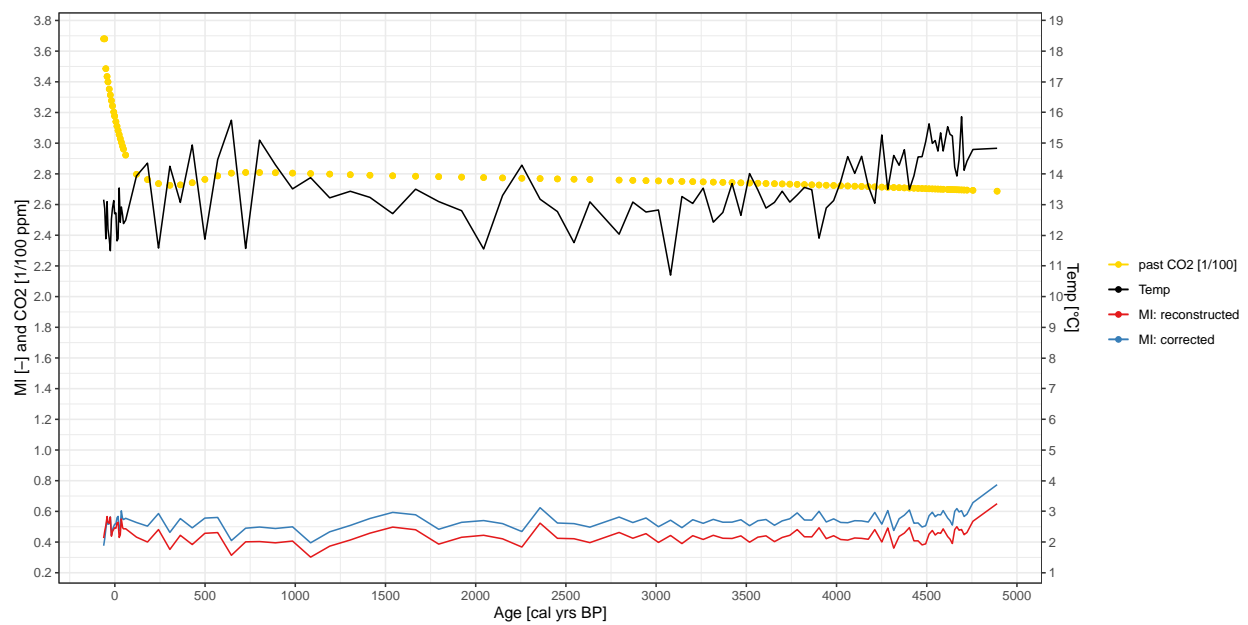


A3. Reconstructed vs corrected MI: Past CO2 calculated using loess

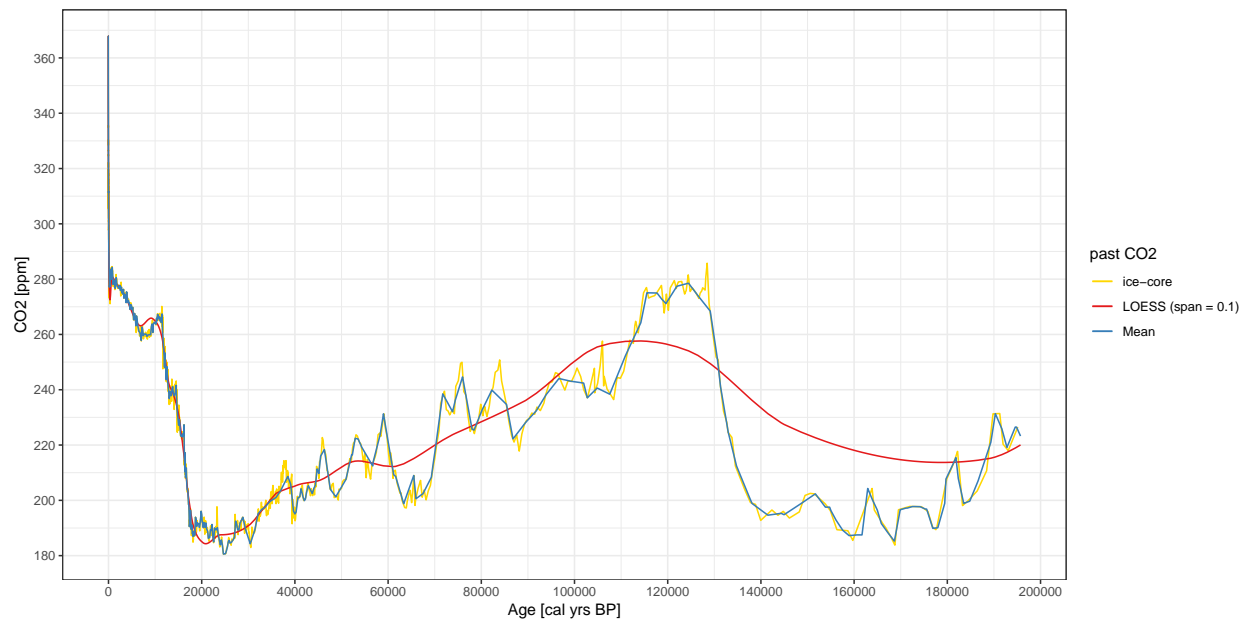
Include past CO2 and Temperature



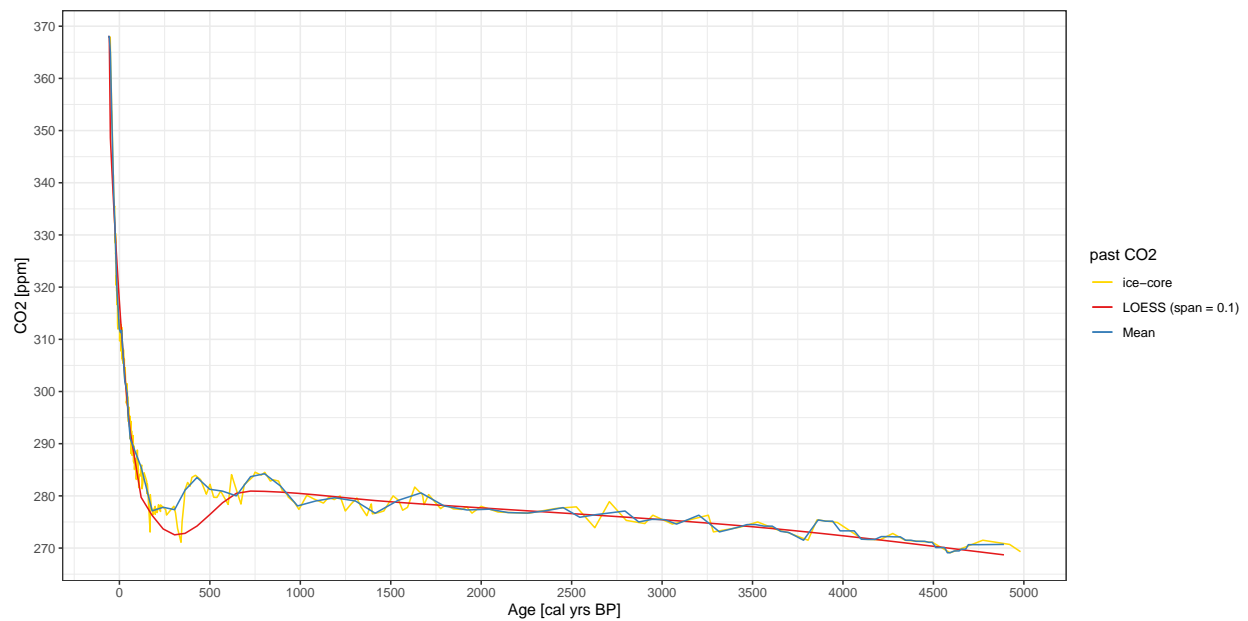
- age < 5k



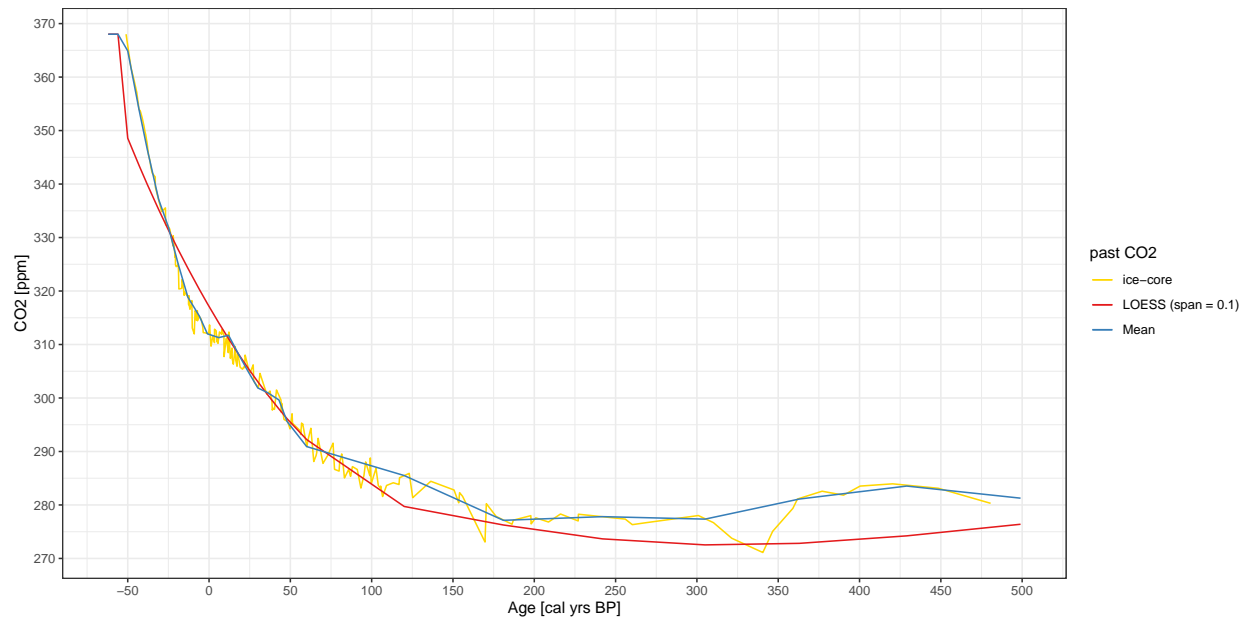
A4. Compare `codos::ice_core` vs past CO2 calculate using `mean` and `loess`



- 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	0.3761916	0.3433725	405.3445
-56	12.862720	368.020	332.165	12.862720	0.471798	0.4222576	0.3894927	453.4250
-50	11.884725	364.900	332.165	11.884725	0.506921	0.4619285	0.4295967	519.9328
-43	13.093390	353.835	332.165	13.093390	0.566461	0.5350491	0.5018830	595.2649
-38	12.203865	346.520	332.165	12.203865	0.528049	0.5071935	0.4745842	531.5279
-31	11.879800	337.155	332.165	11.879800	0.522880	0.5154825	0.4830260	514.0037
-25	11.495670	331.960	332.165	11.495670	0.562884	0.5631914	0.5308230	577.1140
-19	12.525630	325.080	332.165	12.525630	0.438233	0.4491507	0.4165062	506.4300
-13	12.889695	318.840	332.165	12.889695	0.468382	0.4894679	0.4565260	563.6046
-6	13.130160	315.340	332.165	13.130160	0.483879	0.5109222	0.4777937	580.9149
-1	12.701260	312.000	332.165	12.701260	0.493117	0.5256401	0.4927156	586.3366
6	12.724970	311.290	332.165	12.724970	0.490124	0.5238704	0.4909372	559.3670
12	11.815300	311.730	332.165	11.815300	0.524648	0.5572286	0.5247071	580.7053
18	11.888230	308.260	332.165	11.888230	0.528909	0.5674820	0.5348976	579.7070
24	13.540305	304.970	332.165	13.540305	0.429877	0.4751270	0.4418514	508.4131
30	12.423860	301.880	332.165	12.423860	0.446556	0.4965325	0.4638298	526.3707
36	12.921615	301.000	332.165	12.921615	0.550525	0.6029273	0.5696940	645.0361
43	12.653010	299.630	332.165	12.653010	0.494339	0.5488059	0.5158524	595.2392
48	12.378860	295.610	332.165	12.378860	0.486138	0.5477926	0.5149917	575.7525
60	12.490615	290.920	332.165	12.490615	0.486739	0.5574900	0.5246049	580.8438
120	13.932820	285.500	332.165	13.932820	0.432149	0.5153554	0.4817527	590.3221
181	14.350570	277.130	332.165	14.350570	0.400314	0.5017560	0.4679374	565.7499
242	11.581430	277.815	332.165	11.581430	0.481347	0.5771817	0.5447356	653.2236
305	14.247445	277.355	332.165	14.247445	0.351935	0.4523378	0.4187029	540.6937
363	13.068665	281.110	332.165	13.068665	0.444194	0.5352474	0.5020948	633.0995
429	14.941955	283.535	332.165	14.941955	0.383781	0.4723618	0.4382538	582.6511
499	11.871105	281.270	332.165	11.871105	0.457146	0.5461264	0.5136018	638.4043
570	14.464090	280.910	332.165	14.464090	0.461804	0.5556977	0.5216771	653.0763
646	15.748480	280.005	332.165	15.748480	0.313710	0.4108254	0.3763597	569.2010
725	11.569615	283.690	332.165	11.569615	0.401503	0.4848189	0.4525974	561.1782
802	15.099470	284.240	332.165	15.099470	0.403256	0.4907292	0.4564770	583.9280
890	14.293475	281.905	332.165	14.293475	0.395018	0.4860517	0.4523061	584.0881

985	13.511010	278.075	332.165	13.511010	0.406559	0.5044984	0.4711682	635.6006
1085	13.877625	279.020	332.165	13.877625	0.301657	0.3974636	0.3641817	517.1887
1191	13.218835	279.640	332.165	13.218835	0.373369	0.4672615	0.4341885	535.3667
1305	13.432900	279.020	332.165	13.432900	0.413576	0.5094160	0.4761187	596.0735
1414	13.233040	276.675	332.165	13.233040	0.458016	0.5588548	0.5255518	615.7181
1540	12.702920	279.130	332.165	12.702920	0.497576	0.5925613	0.5594750	716.3942
1667	13.501385	280.575	332.165	13.501385	0.480201	0.5733186	0.5398264	654.3948
1795	13.096470	278.070	332.165	13.096470	0.386541	0.4836384	0.4505949	577.4293
1922	12.799950	277.300	332.165	12.799950	0.431293	0.5298470	0.4968578	670.9252
2044	11.551290	277.450	332.165	11.551290	0.444219	0.5405047	0.5081610	638.0359
2149	13.294700	276.800	332.165	13.294700	0.421076	0.5214812	0.4882337	619.9899
2256	14.283885	276.700	332.165	14.283885	0.367480	0.4694930	0.4357940	585.5427
2357	13.174110	277.150	332.165	13.174110	0.523369	0.6235591	0.5901330	684.2198
2453	12.771775	277.750	332.165	12.771775	0.424511	0.5220126	0.4890579	620.7005
2545	11.757505	275.900	332.165	11.757505	0.421738	0.5214436	0.4890374	639.3779
2633	13.088010	276.400	332.165	13.088010	0.396330	0.4970490	0.4639778	593.3285
2795	12.033940	277.100	332.165	12.033940	0.462588	0.5605148	0.5278694	613.9081
2871	13.081115	275.000	332.165	13.081115	0.424956	0.5289018	0.4957575	652.1263
2944	12.756910	275.500	332.165	12.756910	0.454794	0.5573043	0.5242729	649.0941
3013	12.822585	275.450	332.165	12.822585	0.397566	0.4998690	0.4669394	622.9522
3080	10.699305	274.600	332.165	10.699305	0.443022	0.5438932	0.5119745	662.9876
3143	13.261510	275.450	332.165	13.261510	0.390003	0.4930328	0.4598732	596.0177
3203	13.035830	276.300	332.165	13.035830	0.441610	0.5427885	0.5096361	620.6982
3261	13.535495	274.700	332.165	13.535495	0.416972	0.5223470	0.4889592	631.8681
3317	12.425060	273.100	332.165	12.425060	0.444067	0.5511021	0.5182682	649.7246
3370	12.743310	273.550	332.165	12.743310	0.424860	0.5313452	0.4983838	634.6828
3421	13.684420	274.000	332.165	13.684420	0.423377	0.5306250	0.4971306	615.4971
3470	12.647450	274.500	332.165	12.647450	0.440416	0.5447838	0.5118431	644.7587
3518	14.010410	274.500	332.165	14.010410	0.399001	0.5055770	0.4719523	609.2175
3564	13.475130	274.200	332.165	13.475130	0.432065	0.5385428	0.5051504	659.3526
3609	12.885270	274.200	332.165	12.885270	0.440593	0.5460435	0.5129678	628.5549
3656	13.071425	273.200	332.165	13.071425	0.402640	0.5103248	0.4772309	577.6136
3699	13.434470	273.000	332.165	13.434470	0.430108	0.5391436	0.5057732	645.5049
3741	13.080005	272.250	332.165	13.080005	0.444006	0.5541338	0.5209291	637.5023

3782	13.312910	271.500	332.165	13.312910	0.481336	0.5938955	0.5604619	657.7213
3822	13.559430	273.450	332.165	13.559430	0.434527	0.5428410	0.5093894	623.5562
3863	13.483015	275.400	332.165	13.483015	0.433829	0.5377044	0.5043095	629.2010
3903	11.902960	275.150	332.165	11.902960	0.493315	0.5953871	0.5627285	676.1427
3943	12.888460	275.150	332.165	12.888460	0.422033	0.5252850	0.4922575	616.0016
3984	13.129820	273.300	332.165	13.129820	0.441372	0.5492537	0.5160326	637.1772
4023	13.747505	273.300	332.165	13.747505	0.416761	0.5256302	0.4921112	622.4685
4062	14.563010	273.300	332.165	14.563010	0.412826	0.5232877	0.4892869	624.5960
4101	14.015225	271.700	332.165	14.015225	0.426782	0.5398540	0.5061424	650.8488
4139	14.572930	271.650	332.165	14.572930	0.424069	0.5383907	0.5043465	649.2176
4176	13.604615	271.650	332.165	13.604615	0.418275	0.5305590	0.4971111	616.4391
4212	13.041955	272.200	332.165	13.041955	0.481193	0.5916593	0.5583853	688.8406
4251	15.268020	272.200	332.165	15.268020	0.400423	0.5147712	0.4803524	629.3886
4284	13.499280	272.150	332.165	13.499280	0.491962	0.6035194	0.5699549	680.8654
4317	14.600530	272.150	332.165	14.600530	0.360241	0.4729503	0.4390512	623.8715
4347	14.278675	271.500	332.165	14.278675	0.436612	0.5507635	0.5168675	626.9399
4376	14.787685	271.500	332.165	14.787685	0.458481	0.5738932	0.5396286	654.5996
4404	13.491295	271.300	332.165	13.491295	0.494253	0.6077254	0.5741554	679.6487
4429	13.935795	271.300	332.165	13.935795	0.407680	0.5213346	0.4877155	623.3688
4452	14.553305	271.300	332.165	14.553305	0.407926	0.5228705	0.4888767	639.3649
4474	14.558790	271.100	332.165	14.558790	0.381470	0.4966599	0.4627276	622.5988
4494	15.045370	271.100	332.165	15.045370	0.388216	0.5045127	0.4702600	635.5961
4513	15.631435	270.100	332.165	15.631435	0.451673	0.5721740	0.5373777	692.2744
4531	14.992585	270.100	332.165	14.992585	0.475532	0.5947873	0.5603428	692.6523
4547	15.086240	270.100	332.165	15.086240	0.446055	0.5652636	0.5308337	671.7431
4562	14.741750	270.100	332.165	14.741750	0.460775	0.5793450	0.5450954	688.8042
4577	15.337330	269.100	332.165	15.337330	0.456752	0.5789800	0.5443563	667.9784
4591	14.744645	269.100	332.165	14.744645	0.486113	0.6072450	0.5729243	707.2872
4616	15.537315	269.450	332.165	15.537315	0.435921	0.5576009	0.5229023	688.5483
4629	15.289300	269.450	332.165	15.289300	0.418996	0.5399518	0.5054565	636.4726
4642	15.236480	269.450	332.165	15.236480	0.390457	0.5110392	0.4766498	660.9256
4655	14.217500	269.800	332.165	14.217500	0.481282	0.5995810	0.5656016	737.8847
4667	13.929305	269.800	332.165	13.929305	0.500180	0.6180248	0.5841726	701.7630
4679	14.456340	269.800	332.165	14.456340	0.477212	0.5959943	0.5618790	725.7610

4693	15.862295	270.650	332.165	15.862295	0.481918	0.6019183	0.5668959	689.2326
4707	14.117130	270.650	332.165	14.117130	0.448255	0.5641050	0.5302732	682.7249
4723	14.411470	270.650	332.165	14.411470	0.462332	0.5789264	0.5448805	729.5884
4756	14.795020	270.650	332.165	14.795020	0.535625	0.6536780	0.6192107	758.8290
4890	14.834370	270.700	332.165	14.834370	0.650277	0.7692824	0.7345037	851.4375
5015	16.790890	268.950	332.165	16.790890	0.458337	0.5844670	0.5488608	693.3746
5202	14.724575	269.800	332.165	14.724575	0.510507	0.6301700	0.5958050	705.6968
5403	15.916575	265.300	332.165	15.916575	0.451895	0.5846648	0.5496501	681.3717
5596	13.197670	267.600	332.165	13.197670	0.580824	0.7028895	0.6692578	827.2346
5763	14.989795	265.700	332.165	14.989795	0.490060	0.6198905	0.5853852	711.4548
5879	14.690215	263.100	332.165	14.690215	0.633639	0.7704566	0.7357655	846.1308
5953	16.610490	263.700	332.165	16.610490	0.488720	0.6277051	0.5921128	714.3459
6007	14.797680	266.700	332.165	14.797680	0.526236	0.6535387	0.6190701	756.2113
6056	15.365505	266.100	332.165	15.365505	0.462299	0.5918237	0.5571498	692.5466
6118	15.526410	265.500	332.165	15.526410	0.467143	0.5985730	0.5637784	713.6316
6206	16.861230	264.350	332.165	16.861230	0.391183	0.5282444	0.4927338	660.9365
6338	15.520625	262.700	332.165	15.520625	0.510261	0.6490065	0.6140890	738.3900
6523	15.196245	261.150	332.165	15.196245	0.454215	0.5953893	0.5608145	697.4213
6729	14.751830	260.750	332.165	14.751830	0.572781	0.7149893	0.6803969	798.8909
7025	16.292160	257.850	332.165	16.292160	0.500633	0.6538874	0.6184458	757.8403
7198	15.048425	262.650	332.165	15.048425	0.548170	0.6861753	0.6514678	768.2266
7311	15.212085	261.850	332.165	15.212085	0.556734	0.6972510	0.6624116	754.2049
7457	13.652665	259.550	332.165	13.652665	0.474606	0.6159186	0.5822346	686.9066
7630	15.563800	260.100	332.165	15.563800	0.496452	0.6417214	0.6067942	720.9730
7821	16.512985	260.050	332.165	16.512985	0.573211	0.7221689	0.6864026	806.6820
8024	15.154520	260.200	332.165	15.154520	0.577937	0.7226733	0.6878074	806.7577
8233	16.430325	259.300	332.165	16.430325	0.492751	0.6425464	0.6070397	743.5385
8442	15.368730	259.800	332.165	15.368730	0.507928	0.6535355	0.6187049	756.6750
8847	14.772840	259.950	332.165	14.772840	0.609482	0.7541392	0.7194368	847.6206
9040	14.501085	259.850	332.165	14.501085	0.580817	0.7246965	0.6902358	772.4991
9205	14.772915	262.850	332.165	14.772915	0.585610	0.7227812	0.6881564	812.1930
9340	16.114460	263.750	332.165	16.114460	0.519646	0.6574549	0.6221240	722.4493
9441	15.439775	262.900	332.165	15.439775	0.577847	0.7165572	0.6815228	785.4815
9522	14.951680	260.750	332.165	14.951680	0.548766	0.6912607	0.6566017	778.8778

9589	15.205050	263.800	332.165	15.205050	0.450967	0.5855780	0.5510222	689.9886
9654	15.017930	263.800	332.165	15.017930	0.546659	0.6817318	0.6470547	753.7362
9723	15.199465	263.800	332.165	15.199465	0.569147	0.7049055	0.6700551	766.5471
9806	15.815015	264.400	332.165	15.815015	0.417580	0.5519656	0.5171004	662.8689
9823	14.884225	264.400	332.165	14.884225	0.487888	0.6205856	0.5861448	743.1883
9843	16.120400	264.400	332.165	16.120400	0.480904	0.6167196	0.5814881	653.7738
9862	14.437820	264.400	332.165	14.437820	0.524941	0.6568967	0.6226423	737.4200
9882	14.242735	264.400	332.165	14.242735	0.593003	0.7251378	0.6908343	775.6575
9903	15.793380	264.300	332.165	15.793380	0.493796	0.6291215	0.5940757	722.3362
9925	16.457260	264.300	332.165	16.457260	0.428127	0.5645752	0.5292491	660.6682
9951	15.717115	264.300	332.165	15.717115	0.473277	0.6082010	0.5732581	664.7922
9975	15.131305	264.300	332.165	15.131305	0.453730	0.5869589	0.5524464	660.1214
10001	15.323460	264.200	332.165	15.323460	0.532910	0.6676456	0.6328088	727.7551
10028	14.871245	264.100	332.165	14.871245	0.558392	0.6924725	0.6578612	746.5602
10057	17.511240	264.100	332.165	17.511240	0.414236	0.5540030	0.5179663	611.0141
10089	15.605590	264.100	332.165	15.605590	0.595404	0.7317328	0.6965521	793.1886
10120	16.048725	264.000	332.165	16.048725	0.350761	0.4860880	0.4512356	575.6681
10153	16.008700	263.700	332.165	16.008700	0.473838	0.6110292	0.5758867	658.1242
10187	15.144115	263.700	332.165	15.144115	0.481948	0.6169531	0.5823575	662.1939
10222	16.486195	264.550	332.165	16.486195	0.392532	0.5280812	0.4928285	621.2217
10262	17.041910	264.550	332.165	17.041910	0.394061	0.5311499	0.4955059	631.6714
10299	15.637060	265.700	332.165	15.637060	0.427851	0.5586968	0.5239308	670.8525
10337	15.631225	265.300	332.165	15.631225	0.426451	0.5582432	0.5234821	637.5229
10376	15.559980	264.900	332.165	15.559980	0.479709	0.6128127	0.5779606	713.9498
10415	16.365245	266.200	332.165	16.365245	0.414970	0.5463354	0.5111182	628.0704
10458	16.276965	266.200	332.165	16.276965	0.484494	0.6162965	0.5809608	690.3687
10497	16.349345	266.200	332.165	16.349345	0.438019	0.5695642	0.5342985	635.7452
10536	16.278340	267.200	332.165	16.278340	0.464915	0.5940792	0.5587991	685.1293
10612	16.047825	267.200	332.165	16.047825	0.503634	0.6325775	0.5973544	680.2311
10690	16.485350	266.450	332.165	16.485350	0.448163	0.5795441	0.5441607	632.9643
10762	16.975485	266.000	332.165	16.975485	0.435743	0.5694244	0.5337283	669.9022
10835	17.668380	265.550	332.165	17.668380	0.473725	0.6108398	0.5745413	683.9614
10904	15.477845	266.350	332.165	15.477845	0.524962	0.6547501	0.6198459	721.1465
10972	15.780770	266.200	332.165	15.780770	0.567718	0.6990384	0.6638247	742.3301

11044	17.062450	266.200	332.165	17.062450	0.422194	0.5554798	0.5197586	617.6492
11113	14.071460	264.800	332.165	14.071460	0.541849	0.6721239	0.6380542	735.1438
11187	16.074465	265.150	332.165	16.074465	0.490152	0.6240747	0.5888553	723.5545
11258	17.405490	264.400	332.165	17.405490	0.513015	0.6527113	0.6164945	647.6806
11333	15.502385	264.455	332.165	15.502385	0.543125	0.6777926	0.6428147	679.7356
11414	14.840655	266.320	332.165	14.840655	0.487248	0.6152008	0.5808006	658.1987
11499	15.364930	267.415	332.165	15.364930	0.513904	0.6407364	0.6059403	687.5588
11594	14.643270	261.000	332.165	14.643270	0.462316	0.6024811	0.5682350	570.0319
11888	15.016305	253.730	332.165	15.016305	0.445394	0.6049536	0.5704688	623.8726
11954	13.614930	251.455	332.165	13.614930	0.389403	0.5500744	0.5165730	534.6402
12022	14.482675	248.130	332.165	14.482675	0.465376	0.6384501	0.6042138	657.4962
12091	14.124780	253.345	332.165	14.124780	0.417931	0.5755301	0.5416656	568.0745
12234	12.575605	249.090	332.165	12.575605	0.480760	0.6456592	0.6125158	599.3191
12382	12.307820	243.655	332.165	12.307820	0.477946	0.6564061	0.6233841	628.8189
12537	12.471630	248.330	332.165	12.471630	0.474711	0.6412176	0.6081422	625.0180
12698	12.908245	242.915	332.165	12.908245	0.428726	0.6104359	0.5771919	576.9714
12871	13.249050	240.295	332.165	13.249050	0.425493	0.6155424	0.5820929	596.7822
13043	13.682535	236.770	332.165	13.682535	0.483385	0.6859010	0.6520288	654.9025
13218	12.610745	239.410	332.165	12.610745	0.536082	0.7279998	0.6946393	681.9432
13397	13.914370	237.830	332.165	13.914370	0.439547	0.6391906	0.6052954	630.0582
13578	14.723270	239.845	332.165	14.723270	0.458435	0.6555123	0.6210852	637.0152
13762	13.627845	241.110	332.165	13.627845	0.466207	0.6558340	0.6220673	654.3162
13947	15.317390	238.245	332.165	15.317390	0.469603	0.6738442	0.6389958	685.4872
14133	13.802605	237.820	332.165	13.802605	0.450253	0.6496710	0.6158164	680.9545
14327	14.841775	238.940	332.165	14.841775	0.349928	0.5485084	0.5142732	577.5430
14512	13.351390	241.600	332.165	13.351390	0.498382	0.6861326	0.6524530	694.0694
14695	14.525705	233.200	332.165	14.525705	0.418140	0.6335829	0.5993322	670.5942
14877	13.996235	230.035	332.165	13.996235	0.433336	0.6565398	0.6225533	686.2702
15056	15.177935	227.185	332.165	15.177935	0.443005	0.6805962	0.6458203	737.9101
15144	13.245490	229.240	332.165	13.245490	0.489104	0.7125868	0.6789041	745.8076
15231	13.647995	229.225	332.165	13.647995	0.515634	0.7412501	0.7072633	780.3601
15317	12.467560	227.640	332.165	12.467560	0.513872	0.7395619	0.7062532	778.9844
15402	13.452520	225.065	332.165	13.452520	0.492902	0.7304189	0.6965730	788.0594
15486	14.472345	223.400	332.165	14.472345	0.459350	0.7063115	0.6719140	784.3187

15576	16.186575	223.145	332.165	16.186575	0.491031	0.7479625	0.7123537	884.2157
15722	12.524460	223.510	332.165	12.524460	0.429873	0.6672660	0.6340991	611.2689
15793	12.398135	223.610	332.165	12.398135	0.430739	0.6673009	0.6342034	677.5303
15870	10.760215	222.935	332.165	10.760215	0.453890	0.6863872	0.6541047	592.5955
15939	12.350730	223.770	332.165	12.350730	0.365376	0.6001015	0.5671908	640.3408
16006	12.724970	223.400	332.165	12.724970	0.375637	0.6132779	0.5801296	575.6980
16072	13.518925	224.360	332.165	13.518925	0.366020	0.6038658	0.5702892	704.7059
16137	10.445880	223.635	332.165	10.445880	0.441893	0.6708435	0.6387540	642.0358
16206	13.415415	227.320	332.165	13.415415	0.342865	0.5705547	0.5371189	556.2836
16269	11.893750	216.390	332.165	11.893750	0.422392	0.6800057	0.6471509	530.7815
16330	10.199119	213.515	332.165	10.199119	0.474221	0.7349498	0.7028324	667.2156
16391	11.017990	210.360	332.165	11.017990	0.442874	0.7173032	0.6848176	818.0684
16452	11.550620	217.190	332.165	11.550620	0.395824	0.6487824	0.6161830	597.8156
16517	11.802705	208.300	332.165	11.802705	0.278469	0.5604557	0.5279331	555.2731
16576	11.148750	208.555	332.165	11.148750	0.448982	0.7304409	0.6978575	831.9209
16635	12.849935	210.805	332.165	12.849935	0.375400	0.6558208	0.6225002	570.1588
16694	13.012700	211.700	332.165	13.012700	0.341791	0.6191903	0.5858663	723.2054
16753	12.077215	207.890	332.165	12.077215	0.363719	0.6503340	0.6174514	641.0506
16818	14.158905	205.360	332.165	14.158905	0.373298	0.6808974	0.6467535	787.2369
16876	10.790900	204.060	332.165	10.790900	0.451034	0.7468549	0.7144155	705.8671
16935	12.048430	203.625	332.165	12.048430	0.390956	0.6935740	0.6606039	843.4951
16994	10.837725	203.625	332.165	10.837725	0.480079	0.7783579	0.7458210	830.5738
17053	10.031810	203.210	332.165	10.031810	0.465448	0.7609278	0.7288319	745.6929
17118	9.895848	200.365	332.165	9.895848	0.461283	0.7664154	0.7343725	755.6722
17177	10.426055	198.460	332.165	10.426055	0.477632	0.7930187	0.7606544	885.7438
17236	12.864705	198.290	332.165	12.864705	0.380516	0.7080589	0.6746041	622.4888
17295	11.274705	195.265	332.165	11.274705	0.446154	0.7779182	0.7451579	854.7556
17354	12.146745	190.500	332.165	12.146745	0.404584	0.7601478	0.7269658	814.3635
17419	11.463015	191.325	332.165	11.463015	0.396909	0.7445327	0.7117529	678.5730
17478	10.420725	192.240	332.165	10.420725	0.424005	0.7624192	0.7301288	684.3315
17537	12.035565	192.495	332.165	12.035565	0.385468	0.7315032	0.6984497	860.4255
17596	11.631775	196.375	332.165	11.631775	0.438248	0.7674790	0.7345561	826.7604
17655	11.983090	193.795	332.165	11.983090	0.352284	0.6918316	0.6589008	681.9830
17720	11.907815	189.965	332.165	11.907815	0.419211	0.7758853	0.7427950	711.6062

17779	10.722560	189.475	332.165	10.722560	0.441874	0.7938276	0.7613128	709.3704
17838	11.743250	190.365	332.165	11.743250	0.407721	0.7613633	0.7283956	674.5215
17898	12.404180	190.990	332.165	12.404180	0.365678	0.7198189	0.6865924	819.1725
17957	11.455935	188.600	332.165	11.455935	0.376603	0.7350508	0.7022970	651.1218
18023	12.783990	187.790	332.165	12.783990	0.349292	0.7192738	0.6858374	714.8917
18084	13.026125	188.615	332.165	13.026125	0.392178	0.7613955	0.7277205	667.3806
18145	12.796495	186.945	332.165	12.796495	0.328991	0.7022120	0.6688097	669.5786
18207	12.380540	187.265	332.165	12.380540	0.382299	0.7527159	0.7194237	682.3979
18269	10.786970	188.775	332.165	10.786970	0.431274	0.7862648	0.7537352	645.6165
18339	12.451600	187.925	332.165	12.451600	0.363905	0.7314257	0.6981453	684.1400
18402	11.038440	188.340	332.165	11.038440	0.502894	0.8631604	0.8303221	839.6596
18466	12.180700	187.270	332.165	12.180700	0.381802	0.7508320	0.7176538	733.5991
18530	10.514090	187.670	332.165	10.514090	0.435265	0.7933398	0.7609310	767.9538
18666	12.243875	193.900	332.165	12.243875	0.278691	0.6175555	0.5846611	600.3622
18796	11.128360	192.970	332.165	11.128360	0.398897	0.7378414	0.7052510	775.1018
18939	10.852120	190.605	332.165	10.852120	0.461861	0.8104249	0.7778057	759.0720
19087	10.722190	191.900	332.165	10.722190	0.409936	0.7511102	0.7186955	772.9031
19227	10.324510	191.335	332.165	10.324510	0.375349	0.7156371	0.6835031	726.6476
19370	10.942980	191.550	332.165	10.942980	0.472478	0.8179649	0.7852816	764.0667
19504	9.740445	190.235	332.165	9.740445	0.489560	0.8338669	0.8017431	797.2119
19639	10.050925	191.420	332.165	10.050925	0.467545	0.8082514	0.7760365	895.1832
19768	10.674020	193.600	332.165	10.674020	0.472280	0.8078827	0.7753596	859.9825
19886	12.180290	196.060	332.165	12.180290	0.465912	0.8003185	0.7670225	884.6599
20003	10.977170	194.890	332.165	10.977170	0.461431	0.7933518	0.7607087	939.6048
20106	10.556615	192.095	332.165	10.556615	0.427358	0.7672209	0.7348517	797.9702
20206	11.882545	192.095	332.165	11.882545	0.431126	0.7790314	0.7459473	804.6561
20295	9.269087	190.230	332.165	9.269087	0.511353	0.8535931	0.8216477	945.8477
20372	11.081285	190.230	332.165	11.081285	0.420676	0.7711163	0.7384720	744.1083
20448	10.071010	191.960	332.165	10.071010	0.458223	0.7966338	0.7644360	883.0943
20517	10.921845	191.960	332.165	10.921845	0.423512	0.7659563	0.7334057	873.2758
20590	9.857285	190.845	332.165	9.857285	0.489315	0.8317995	0.7996241	945.2407
20666	12.753365	190.845	332.165	12.753365	0.381058	0.7385057	0.7050403	708.0223
20745	9.532400	190.210	332.165	9.532400	0.509561	0.8533031	0.8212340	917.8399
20837	9.162833	191.765	332.165	9.162833	0.491845	0.8268697	0.7950353	839.3725

20940	10.531110	191.765	332.165	10.531110	0.457853	0.7996717	0.7672396	818.0439
21048	9.612870	189.635	332.165	9.612870	0.481180	0.8269962	0.7949494	916.9195
21173	10.006380	189.225	332.165	10.006380	0.491841	0.8418758	0.8096048	984.2348
21301	10.426695	188.645	332.165	10.426695	0.430404	0.7837362	0.7513932	912.1865
21433	8.329884	186.235	332.165	8.329884	0.490850	0.8436960	0.8122030	1012.9251
21574	11.400080	186.595	332.165	11.400080	0.417916	0.7856977	0.7528536	734.9235
21716	10.645230	186.595	332.165	10.645230	0.460863	0.8249945	0.7924460	946.4623
21866	8.680892	189.370	332.165	8.680892	0.455234	0.7963147	0.7647715	786.6467
22031	10.720585	189.080	332.165	10.720585	0.430449	0.7837391	0.7512490	930.6189
22197	9.247492	191.270	332.165	9.247492	0.408191	0.7435643	0.7118814	760.8678
22379	9.802635	187.020	332.165	9.802635	0.528548	0.8875411	0.8552635	1010.7663
22560	10.650660	184.945	332.165	10.650660	0.425217	0.7955262	0.7630438	865.8354
22748	10.275895	190.010	332.165	10.275895	0.386687	0.7323645	0.7002156	661.8226
22952	11.933450	189.400	332.165	11.933450	0.415948	0.7750978	0.7419956	844.9361
23152	12.001330	189.340	332.165	12.001330	0.425240	0.7853313	0.7521682	912.3557
23368	13.181340	190.155	332.165	13.181340	0.371450	0.7344850	0.7007862	822.9495
23577	13.330280	187.385	332.165	13.330280	0.317124	0.6918397	0.6581584	824.7366
23788	12.119755	185.560	332.165	12.119755	0.377940	0.7539546	0.7208020	799.5621
24012	13.303990	183.905	332.165	13.303990	0.263031	0.6516875	0.6181188	744.2237
24226	13.457145	185.705	332.165	13.457145	0.315264	0.6983679	0.6645972	734.2805
24450	13.995055	183.650	332.165	13.995055	0.321666	0.7184744	0.6843369	675.2743
24662	13.712425	180.570	332.165	13.712425	0.299384	0.7078561	0.6739127	768.2068
24871	12.357000	180.630	332.165	12.357000	0.344610	0.7437382	0.7104804	1017.4070
25088	9.163590	180.690	332.165	9.163590	0.477244	0.8582843	0.8263776	816.5484
25291	11.272245	181.675	332.165	11.272245	0.449034	0.8386498	0.8057479	911.7338
25501	11.086455	183.020	332.165	11.086455	0.440271	0.8223161	0.7895489	885.9858
25699	11.214125	184.960	332.165	11.214125	0.495095	0.8709110	0.8379635	1056.2387
25896	11.459530	185.530	332.165	11.459530	0.381754	0.7535672	0.7207679	918.0159
26104	11.427615	184.545	332.165	11.427615	0.426935	0.8041144	0.7712125	984.5234
26412	11.348065	184.890	332.165	11.348065	0.429776	0.8049823	0.7721200	920.8403
26614	11.676505	185.475	332.165	11.676505	0.405258	0.7794021	0.7464272	844.0302
26829	12.480595	185.935	332.165	12.480595	0.451586	0.8304796	0.7969460	940.9096
27049	11.751265	186.830	332.165	11.751265	0.415035	0.7840213	0.7509956	914.1220
27274	11.103970	192.495	332.165	11.103970	0.404285	0.7451447	0.7125497	725.0086

27506	12.480025	191.380	332.165	12.480025	0.396843	0.7506470	0.7173048	738.2025
27733	12.317240	189.300	332.165	12.317240	0.400278	0.7619458	0.7286664	655.3780
27974	12.569895	189.290	332.165	12.569895	0.371344	0.7339615	0.7006094	645.8669
28219	10.972120	191.705	332.165	10.972120	0.375762	0.7183322	0.6858677	665.5243
28821	11.616680	193.890	332.165	11.616680	0.368870	0.7062405	0.6734704	650.0736
29398	11.096930	189.520	332.165	11.096930	0.524119	0.8803127	0.8474040	890.0964
30419	10.134460	184.300	332.165	10.134460	0.448462	0.8189489	0.7866684	921.2066
31388	11.638685	189.215	332.165	11.638685	0.379583	0.7366673	0.7038136	723.9012
32106	10.132605	195.165	332.165	10.132605	0.484969	0.8116732	0.7794105	802.1501
32889	9.834265	196.700	332.165	9.834265	0.548047	0.8687012	0.8364518	836.6064
33545	10.880855	197.465	332.165	10.880855	0.429742	0.7502708	0.7177779	809.6005
34631	10.377045	199.590	332.165	10.377045	0.458898	0.7693186	0.7370338	919.5401
35945	10.751385	201.045	332.165	10.751385	0.492588	0.8002585	0.7677142	914.7896
36937	9.278780	203.510	332.165	9.278780	0.514820	0.8067138	0.7748714	782.5869
38485	9.198735	208.655	332.165	9.198735	0.498090	0.7713268	0.7396030	814.7363
39103	8.392639	205.800	332.165	8.392639	0.546192	0.8267338	0.7952512	844.9761
39681	11.449825	196.185	332.165	11.449825	0.427039	0.7556990	0.7228997	717.5441
40002	13.257680	195.075	332.165	13.257680	0.314463	0.6558058	0.6222537	703.0022
40253	9.932895	195.795	332.165	9.932895	0.546388	0.8710286	0.8387260	1014.3291
40657	8.272382	200.975	332.165	8.272382	0.500606	0.7966508	0.7652900	822.2035
41029	10.137130	201.250	332.165	10.137130	0.433944	0.7364011	0.7043107	777.8977
41327	9.530069	204.190	332.165	9.530069	0.458241	0.7476675	0.7158427	716.1808
41758	10.671990	201.120	332.165	10.671990	0.441728	0.7475579	0.7151768	723.5401
42029	11.580640	199.890	332.165	11.580640	0.409008	0.7235771	0.6907850	673.8636
42240	8.755353	200.395	332.165	8.755353	0.467121	0.7667521	0.7352425	806.2912
42495	10.413640	202.865	332.165	10.413640	0.495868	0.7951482	0.7627852	823.5422
42877	10.613855	205.305	332.165	10.613855	0.381419	0.6703809	0.6382091	687.8145
43740	11.207270	202.435	332.165	11.207270	0.507078	0.8122591	0.7794530	911.6566
44062	11.711450	204.310	332.165	11.711450	0.391607	0.6899187	0.6571373	631.2344
44404	11.324645	205.525	332.165	11.324645	0.471039	0.7646560	0.7319010	830.6902
44764	11.184635	211.365	332.165	11.184635	0.411543	0.6826604	0.6501709	660.1341
45138	13.376115	209.720	332.165	13.376115	0.323035	0.6089755	0.5754689	552.3525
45525	12.733005	216.005	332.165	12.733005	0.359366	0.6209234	0.5877522	560.6913
46322	12.018120	218.350	332.165	12.018120	0.347459	0.5977700	0.5650443	545.3011

47601	10.271700	204.025	332.165	10.271700	0.407037	0.6994732	0.6674027	675.9510
48772	10.887380	201.280	332.165	10.887380	0.429229	0.7352973	0.7028361	747.2631
50937	11.221780	207.525	332.165	11.221780	0.548830	0.8363825	0.8035121	855.5765
52168	12.206855	216.450	332.165	12.206855	0.385159	0.6432811	0.6103454	637.6610
52330	10.884445	216.450	332.165	10.884445	0.488210	0.7424511	0.7099746	721.5665
52933	10.531495	222.435	332.165	10.531495	0.539465	0.7740986	0.7417259	817.4667
53562	12.023970	222.200	332.165	12.023970	0.590746	0.8330310	0.7997423	895.1996
54360	10.969175	219.165	332.165	10.969175	0.556933	0.8039707	0.7713069	893.6351
56695	11.799285	212.440	332.165	11.799285	0.508502	0.7807384	0.7476948	757.4652
56821	9.676870	214.070	332.165	9.676870	0.529626	0.7873900	0.7554038	748.9739
58294	13.096980	223.750	332.165	13.096980	0.434754	0.6739155	0.6404115	641.1292
59004	12.654425	231.290	332.165	12.654425	0.412567	0.6263021	0.5931616	641.6376
61201	11.728895	209.260	332.165	11.728895	0.554980	0.8389709	0.8058271	938.9693
61618	10.919690	208.640	332.165	10.919690	0.486621	0.7674664	0.7349134	857.9608
63345	10.277420	198.775	332.165	10.277420	0.590586	0.9066022	0.8740479	1072.7019
65500	12.364315	208.980	332.165	12.364315	0.548204	0.8362642	0.8027813	905.8970
65984	13.201235	200.590	332.165	13.201235	0.349848	0.6696246	0.6360714	750.7609
67492	10.500190	202.450	332.165	10.500190	0.461421	0.7618965	0.7295679	802.3888
69280	11.543625	208.340	332.165	11.543625	0.466809	0.7513205	0.7184823	850.3857
69681	8.818884	213.405	332.165	8.818884	0.550936	0.8078037	0.7761715	837.6314
70083	12.575910	217.940	332.165	12.575910	0.331883	0.5857349	0.5527352	723.8546
71728	12.949905	238.510	332.165	12.949905	0.493640	0.6886623	0.6552062	768.9137
73834	12.521990	232.035	332.165	12.521990	0.527963	0.7407874	0.7074455	891.0388
74427	12.942090	236.285	332.165	12.942090	0.470405	0.6714379	0.6380277	794.8047
75975	11.813955	244.640	332.165	11.813955	0.429378	0.6030908	0.5704611	709.6722
78001	16.088725	225.785	332.165	16.088725	0.430684	0.6770569	0.6416937	811.7675
78428	14.814645	225.395	332.165	14.814645	0.523328	0.7664720	0.7317128	842.4868
80167	13.590870	232.670	332.165	13.590870	0.374170	0.5867849	0.5532080	625.2552
82264	9.319097	239.880	332.165	9.319097	0.456190	0.6356715	0.6042029	560.5737
85406	10.705515	234.690	332.165	10.705515	0.407783	0.6048214	0.5727572	584.1828
86807	10.347030	222.220	332.165	10.347030	0.383166	0.6150718	0.5831608	538.3351
89490	11.854085	228.130	332.165	11.854085	0.448199	0.6689356	0.6361282	561.6027
91816	10.817200	232.430	332.165	10.817200	0.548471	0.7543779	0.7219075	756.7037
93907	12.882770	238.210	332.165	12.882770	0.379700	0.5737117	0.5405706	507.1085

96656	12.281340	244.055	332.165	12.281340	0.353974	0.5296645	0.4969598	461.6170
99188	9.735085	243.085	332.165	9.735085	0.430647	0.6025794	0.5709919	642.2870
101967	10.836270	242.415	332.165	10.836270	0.580318	0.7590271	0.7265362	784.6041
102747	11.904570	237.070	332.165	11.904570	0.361761	0.5554086	0.5228442	554.1343
104861	14.935930	240.620	332.165	14.935930	0.484685	0.6806852	0.6460625	735.2625
107565	12.305630	238.385	332.165	12.305630	0.581557	0.7759793	0.7426727	841.0057
110928	13.266150	252.310	332.165	13.266150	0.451387	0.6095832	0.5761383	668.1989
114230	11.368895	264.240	332.165	11.368895	0.526497	0.6519634	0.6194512	681.9960
115535	12.103225	275.060	332.165	12.103225	0.650182	0.7539692	0.7208255	854.3338
117705	15.665745	274.980	332.165	15.665745	0.467457	0.5768196	0.5419893	688.3923
118737	12.090160	272.730	332.165	12.090160	0.591169	0.6995624	0.6665555	779.6743
119619	13.376815	271.165	332.165	13.376815	0.575280	0.6894995	0.6557970	778.1284
121968	14.092390	277.430	332.165	14.092390	0.481000	0.5819098	0.5480490	661.5286
124468	12.453005	278.530	332.165	12.453005	0.494356	0.5901777	0.5572348	663.3333
126463	12.412600	274.085	332.165	12.412600	0.546565	0.6522298	0.6191605	731.3258
129122	13.892880	268.440	332.165	13.892880	0.489728	0.6105431	0.5767308	687.9406
130648	11.791140	251.340	332.165	11.791140	0.615587	0.7741158	0.7410923	843.8920
131332	10.680325	241.130	332.165	10.680325	0.575380	0.7570118	0.7246044	787.1210
132984	10.841310	224.630	332.165	10.841310	0.569515	0.7990604	0.7664733	809.3378
134767	12.392455	212.430	332.165	12.392455	0.554306	0.8303604	0.7968760	847.2341
137439	11.926565	201.460	332.165	11.926565	0.407824	0.7182941	0.6853307	708.6299
138097	11.480050	198.865	332.165	11.480050	0.479383	0.7989801	0.7660628	790.5684
141499	10.685910	194.630	332.165	10.685910	0.462746	0.7940789	0.7615820	746.7889
144323	11.442350	195.305	332.165	11.442350	0.499911	0.8338043	0.8008246	824.1421
144967	12.916365	194.805	332.165	12.916365	0.467325	0.8114524	0.7777193	824.8955
148580	10.440630	198.795	332.165	10.440630	0.536004	0.8515433	0.8190356	820.2700
151686	12.964835	202.350	332.165	12.964835	0.347492	0.6590300	0.6256370	604.6546
153838	11.242885	197.540	332.165	11.242885	0.525301	0.8498127	0.8168998	839.7341
154746	10.348605	197.540	332.165	10.348605	0.466467	0.7846983	0.7523918	795.7420
155018	10.313355	196.300	332.165	10.313355	0.530626	0.8549746	0.8225222	919.7696
156122	12.884660	192.840	332.165	12.884660	0.366830	0.7163571	0.6828710	782.3941
157554	13.089500	189.190	332.165	13.089500	0.471197	0.8404798	0.8065777	934.2227
158915	13.276425	187.250	332.165	13.276425	0.467446	0.8465482	0.8125234	904.7631
160619	7.985918	187.500	332.165	7.985918	0.610210	0.9590701	0.9274689	883.1552

161695	12.010360	187.500	332.165	12.010360	0.446639	0.8152899	0.7820508	851.9200
162919	11.019520	204.300	332.165	11.019520	0.467616	0.7640737	0.7314776	910.6806
163882	11.145145	200.400	332.165	11.145145	0.443579	0.7546408	0.7220023	760.3978
164970	9.264389	196.500	332.165	9.264389	0.482802	0.7997461	0.7679265	795.2107
165836	12.244175	191.600	332.165	12.244175	0.440028	0.7925100	0.7591977	815.5598
167203	9.721515	188.400	332.165	9.721515	0.528851	0.8816008	0.8493761	918.0000
168643	12.880855	185.250	332.165	12.880855	0.491368	0.8773093	0.8434381	935.5844
169889	12.119125	196.600	332.165	12.119125	0.464273	0.7961066	0.7628540	842.2330
171139	10.251235	197.200	332.165	10.251235	0.532404	0.8529721	0.8205552	868.3925
171398	9.795615	197.200	332.165	9.795615	0.505406	0.8229414	0.7908163	829.5359
172514	11.878105	197.750	332.165	11.878105	0.582990	0.9116858	0.8782896	1035.4036
172930	9.116090	197.750	332.165	9.116090	0.597110	0.9112191	0.8792135	951.1345
174149	9.733125	197.700	332.165	9.733125	0.466567	0.7809745	0.7489763	857.3618
175288	11.109840	196.850	332.165	11.109840	0.497959	0.8237752	0.7909925	897.2362
175565	11.614275	196.850	332.165	11.614275	0.536219	0.8658325	0.8326863	921.8545
176896	10.283620	189.850	332.165	10.283620	0.549047	0.8995928	0.8670517	991.7727
177960	12.862945	190.100	332.165	12.862945	0.511227	0.8760604	0.8422023	974.0585
179446	12.538305	198.900	332.165	12.538305	0.460554	0.7856514	0.7521930	775.0306
179707	12.398400	207.700	332.165	12.398400	0.356645	0.6454393	0.6123939	617.0352
181254	12.878315	213.200	332.165	12.878315	0.378381	0.6506102	0.6172862	669.7787
181849	12.580135	215.450	332.165	12.580135	0.397286	0.6607327	0.6275506	748.6566
182354	10.924135	207.900	332.165	10.924135	0.337109	0.6174664	0.5852628	532.3312
183523	10.255550	198.900	332.165	10.255550	0.364258	0.6744691	0.6424647	721.3855
184818	7.416540	199.700	332.165	7.416540	0.499713	0.7964845	0.7654953	763.3381
186603	11.920440	207.050	332.165	11.920440	0.368120	0.6570428	0.6242283	665.9064
189340	10.674150	221.000	332.165	10.674150	0.464490	0.7028561	0.6705784	669.1077
190307	8.493256	231.350	332.165	8.493256	0.506649	0.7075483	0.6762915	855.0577
191709	10.294565	225.850	332.165	10.294565	0.442095	0.6638069	0.6318083	754.0953
192795	10.022120	219.150	332.165	10.022120	0.479334	0.7212185	0.6892193	713.2545
194581	10.191110	226.500	332.165	10.191110	0.496187	0.7164708	0.6844003	714.8435
194846	11.431140	226.500	332.165	11.431140	0.441957	0.6659136	0.6333360	682.8870
195710	11.487825	223.250	332.165	11.487825	0.478354	0.7131504	0.6804317	732.4449