Laguna de Padul Data: MI and P_ann corrections

(37.0108, -3.6039)

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

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

Calculate daily mean temperature

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

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(1901:1990),
                             co2 = purrr::map_dbl(age, codos::past_co2)) %>%
  .$co2 %>%
  median()
```

Assemble the Padul data

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

Find the corrected Annual Precipitation, `P_ann`

Approximated as the ratio

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

multiplied by reconstructed `P_ann`.

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

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

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

age cal yr BP	past temp	past co2	modern co2	present temp	recon. MI	corr. MI	corr. Pann
-62	13.15918	368.020	311.765	13.15918	0.425809	0.3431377	369.7292
-56	12.86272	368.020	311.765	12.86272	0.471798	0.3892587	417.9903
-50	11.88472	364.900	311.765	11.88472	0.506921	0.4293762	483.2929
-43	13.09339	353.835	311.765	13.09339	0.566461	0.5017009	558.1636
-38	12.20387	346.520	311.765	12.20387	0.528049	0.4744323	497.1948
-31	11.87980	337.155	311.765	11.87980	0.522880	0.4829125	481.5272
-25	11.49567	331.960	311.765	11.49567	0.562884	0.5307318	543.8519
-19	12.52563	325.080	311.765	12.52563	0.438233	0.4164441	469.5524
-13	12.88969	318.840	311.765	12.88969	0.468382	0.4564923	525.6344
-6	13.13016	315.340	311.765	13.13016	0.483879	0.4777764	543.2284
-1	12.70126	312.000	311.765	12.70126	0.493117	0.4927145	549.6090
6	12.72497	311.290	311.765	12.72497	0.490124	0.4909395	524.2047
12	11.81530	311.730	311.765	11.81530	0.524648	0.5247072	546.8137

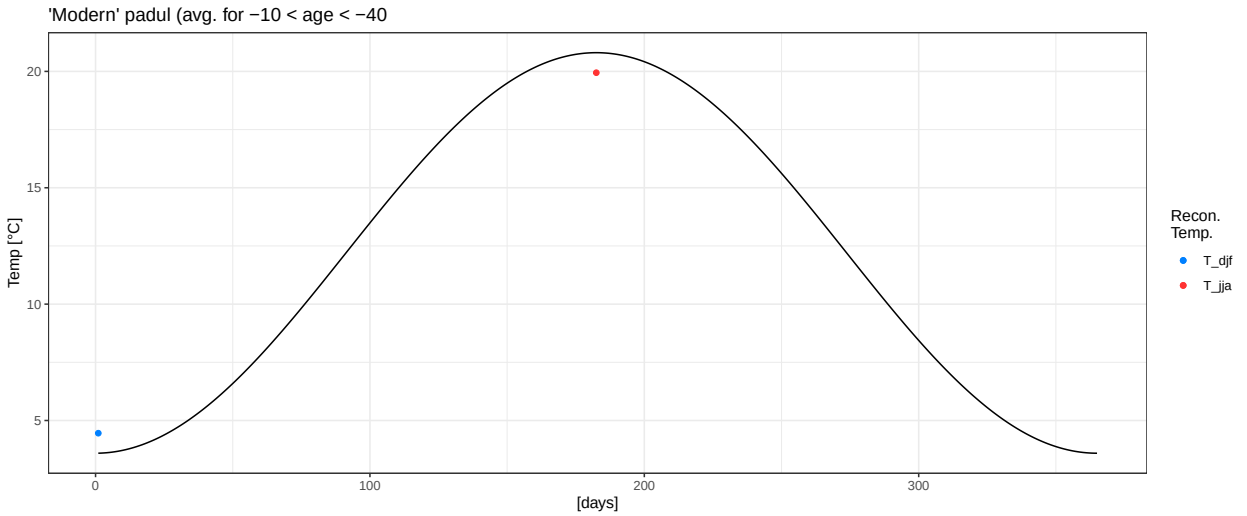
Check out and download the entire dataset in Appendix A5.

New corrections

Calculate temperature anomalies

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

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



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

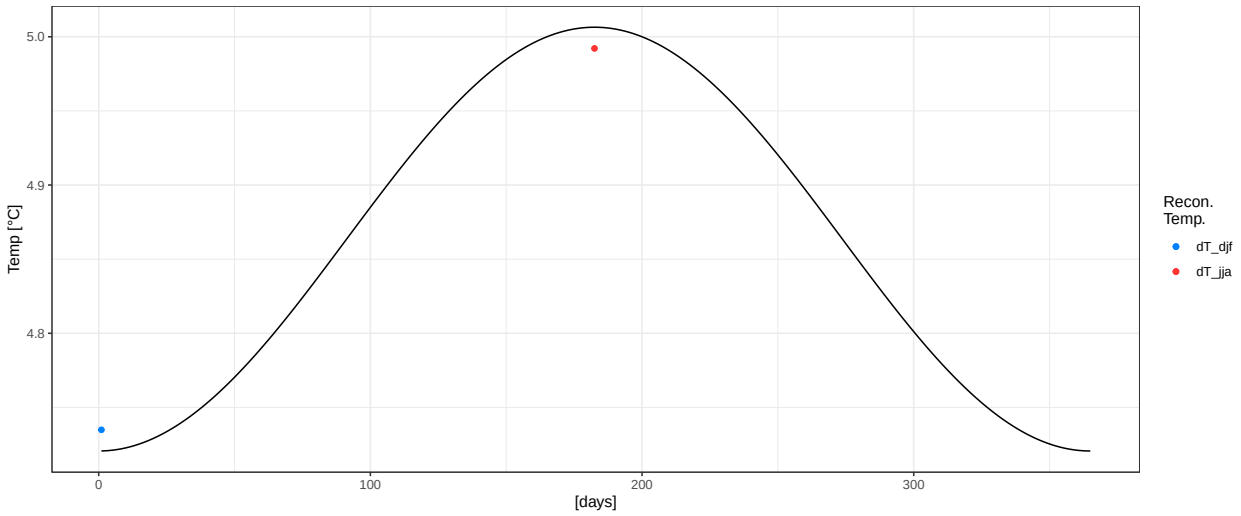
age_cal_yr_BP	MI	P_ann	T_djf	T_jja	Tmean	Tmax	Tmin
-38	0.5280490	553.3840	4.408130	19.99960	12.20387	20.86579	3.541937
-31	0.5228800	521.3800	3.954800	19.80480	11.87980	20.68536	3.074244
-25	0.5628840	576.7990	3.768040	19.22330	11.49567	20.08193	2.909414
-19	0.4382330	494.1200	5.015460	20.03580	12.52563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

where

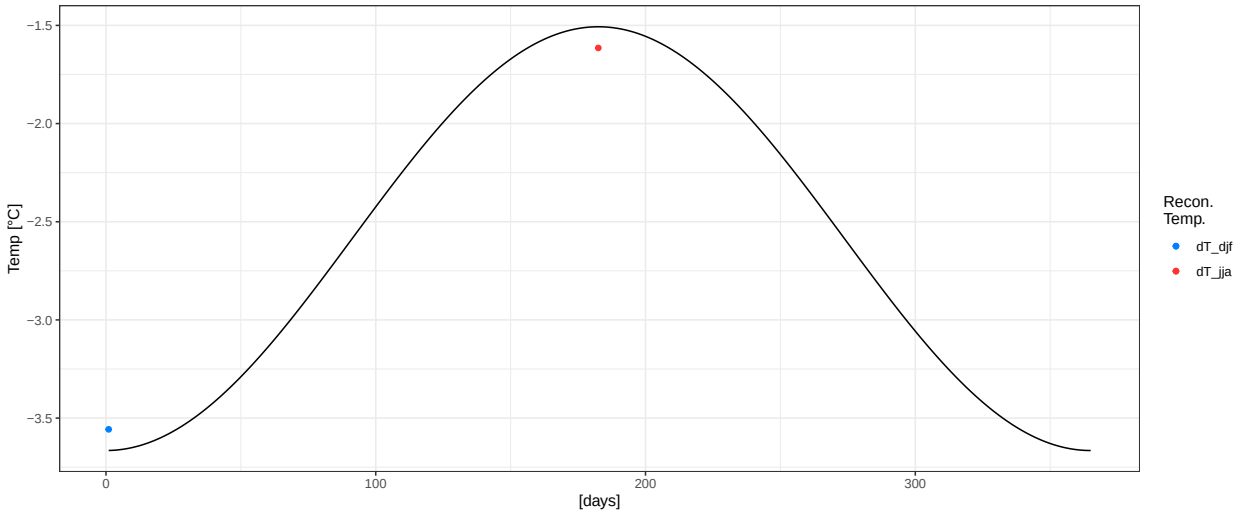
$$T_{\text{mean}} = (T_{\text{jja}} + T_{\text{djf}})/2$$
$$T_{\text{max}} = T_{\text{mean}} + (T_{\text{jja}} - T_{\text{mean}})/0.9$$
$$T_{\text{min}} = T_{\text{mean}} + (T_{\text{djf}} - T_{\text{mean}})/0.9$$

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

Padul: Anomaly for age = 11044 cal yr BP



Padul: Anomaly for age = 21048 cal yr BP

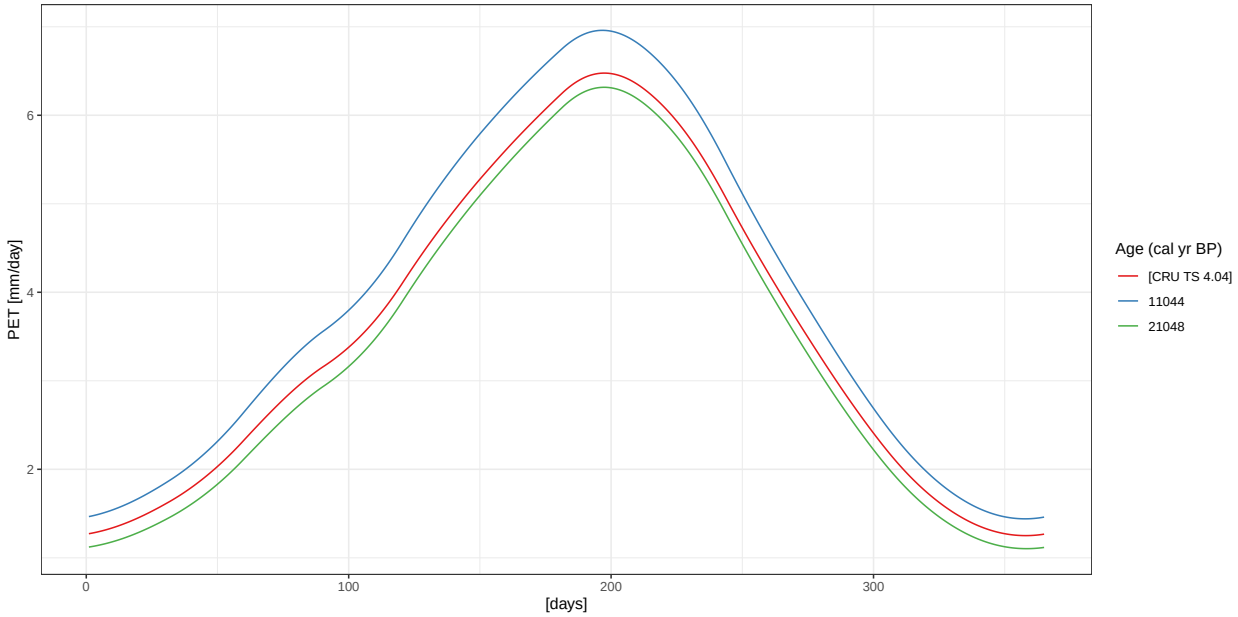


Calculate potential evapotranspiration (PET)

Padul location: 37.0108, -3.6039

Params (`splash::calc_daily_evap`)

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



Calculate corrected Precipitation

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

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

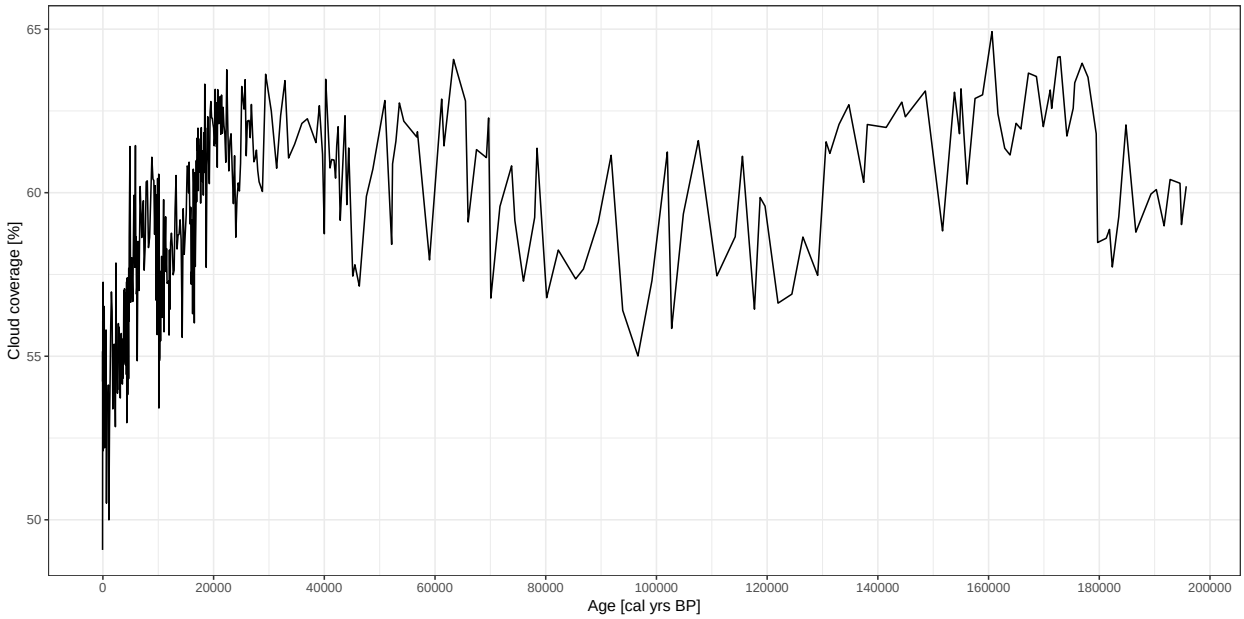
age_cal_yr_BP	MI	P_ann	corr_mi	corr_P_ann (MI ratio)	corr_P_ann (Tmp anomalies)
-62	0.425809	458.807	0.3431377	369.7292	456.1613
-56	0.471798	506.622	0.3892587	417.9903	513.7705
-50	0.506921	570.575	0.4293762	483.2929	554.8881
-43	0.566461	630.212	0.5017009	558.1636	663.7034
-38	0.528049	553.384	0.4744323	497.1948	617.9935
-31	0.522880	521.380	0.4829125	481.5272	625.0736
-25	0.562884	576.799	0.5307318	543.8519	680.5576
-19	0.438233	494.120	0.4164441	469.5524	545.4216

age_cal_yr_BP	MI	P_ann	corr_mi	corr_P_ann (MI ratio)	corr_P_ann (Tmp anomalies)
-13	0.468382	539.325	0.4564923	525.6344	603.2149
-6	0.483879	550.167	0.4777764	543.2284	634.2001
-1	0.493117	550.058	0.4927145	549.6090	648.4301
6	0.490124	523.334	0.4909395	524.2047	646.4942
12	0.524648	546.752	0.5247072	546.8137	678.7565
18	0.528909	540.303	0.5349146	546.4380	691.4560
24	0.429877	459.993	0.4418854	472.8426	592.6163
4679	0.477212	581.116	0.5621175	684.5081	765.6752
4693	0.481918	551.825	0.5671334	649.4017	793.8518
4707	0.448255	542.514	0.5305052	642.0597	717.7396
4723	0.462332	582.651	0.5451134	686.9757	741.3522
4756	0.535625	621.786	0.6194448	719.0891	848.9441
4890	0.650277	719.723	0.7347375	813.2034	1007.1413
11499	0.513904	551.458	0.6061976	650.4960	842.7900
11594	0.462316	437.416	0.5685334	537.9126	781.0302
11888	0.445394	459.323	0.5708210	588.6725	789.4660
11954	0.389403	378.477	0.5169353	502.4309	695.6286
12022	0.465376	479.259	0.6046052	622.6417	828.4256
12091	0.417931	412.517	0.5420163	534.9949	736.6936
21433	0.490850	589.305	0.8131384	976.2382	971.7564
21574	0.417916	390.909	0.7538175	705.1035	968.8427
21716	0.460863	528.718	0.7934012	910.2173	1001.6785
21866	0.455234	449.707	0.7656732	756.3772	925.4349
22031	0.430449	511.119	0.7521747	893.1390	950.6874
22197	0.408191	417.690	0.7127664	729.3531	872.7933
184818	0.499713	478.917	0.7662723	734.3832	896.9381
186603	0.368120	373.086	0.6249659	633.3968	812.6097
189340	0.464490	442.187	0.6711718	638.9447	850.3815
190307	0.506649	612.275	0.6767842	817.8800	813.1431
191709	0.442095	502.227	0.6323565	718.3671	792.5503
192795	0.479334	474.041	0.6898251	682.2078	858.9891
194581	0.496187	495.060	0.6849425	683.3867	857.4603
194846	0.441957	453.222	0.6338857	650.0428	814.9828
195710	0.478354	491.296	0.6810104	699.4353	876.0152

Calculate cloud coverage from corrected MI

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

Padul: cloud coverage

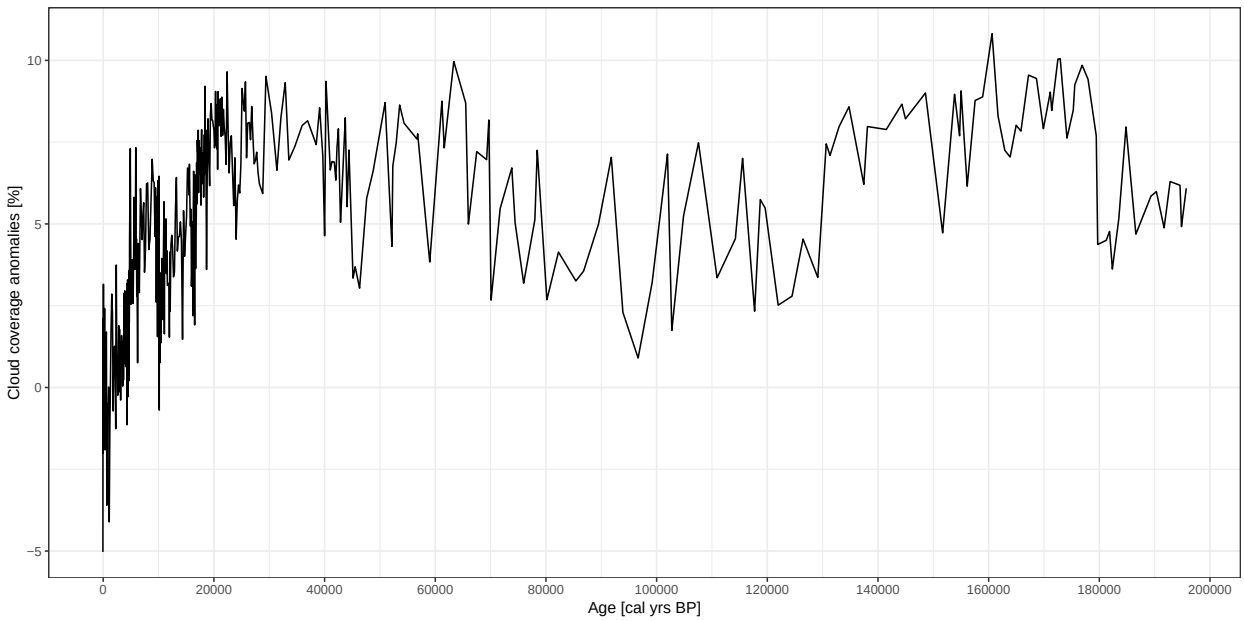


Calculate cloud coverage anomalies

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_cld_corr_mi)
```

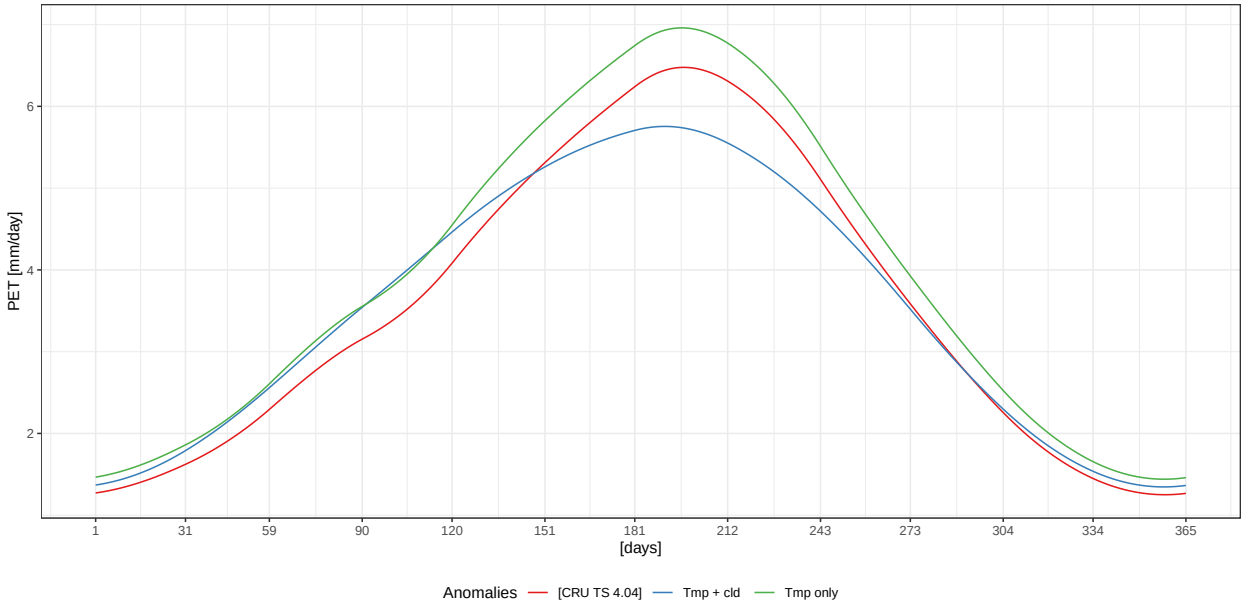
Padul: cloud coverage anomalies



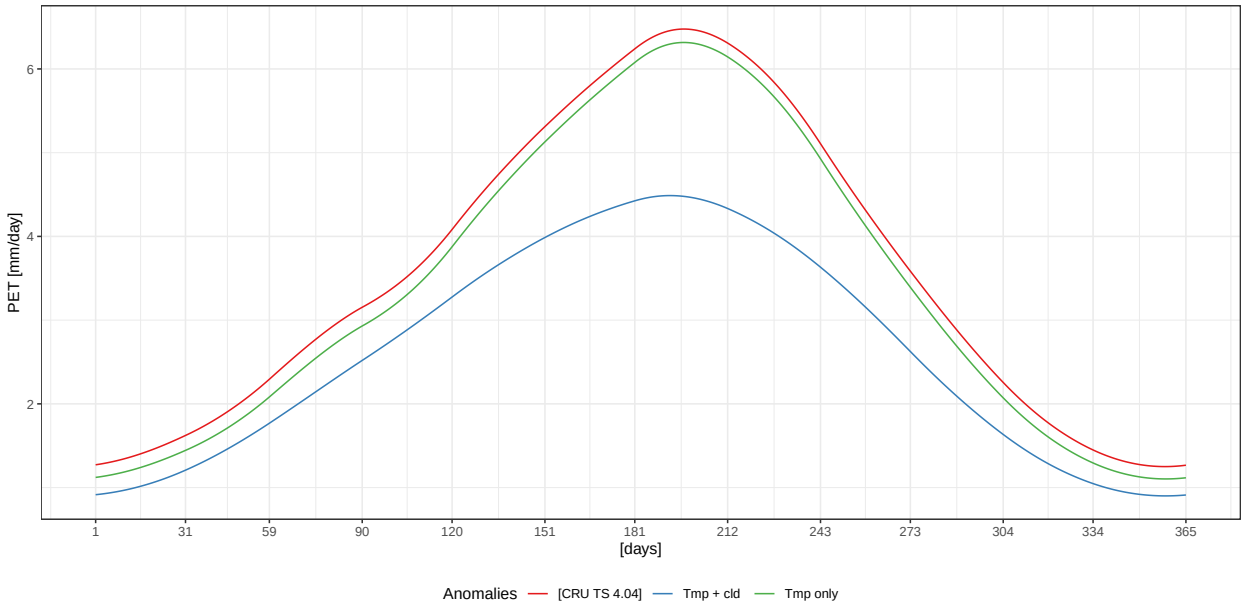
Re-calculate potential evapotranspiration (PET)

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_mi
```

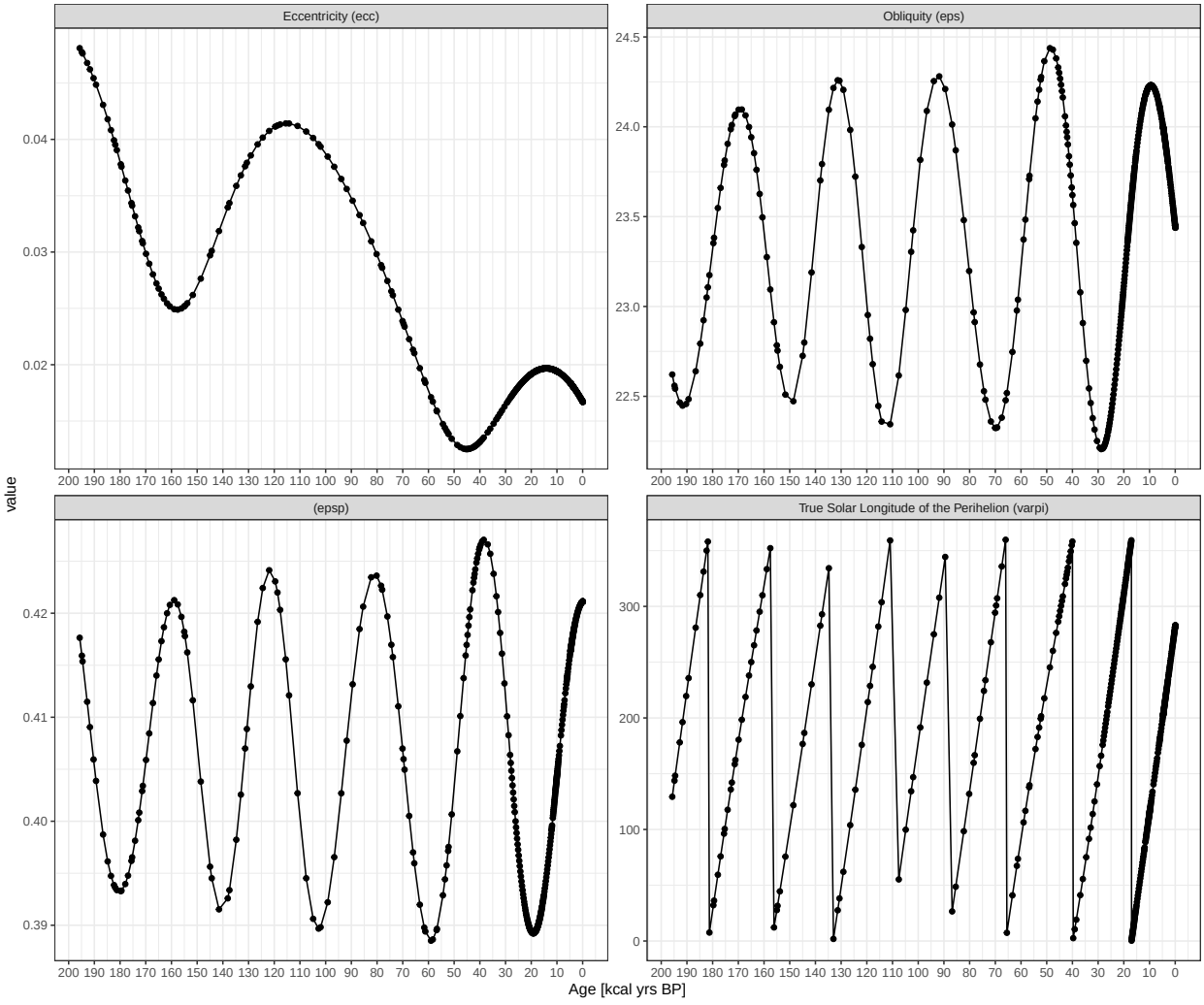
age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corr_mi	corr_P_ann
-62	13.159180	368.020	311.765	13.159180	0.425809	0.3431377	464.8493
-56	12.862720	368.020	311.765	12.862720	0.471798	0.3892587	505.5369
-50	11.884725	364.900	311.765	11.884725	0.506921	0.4293762	530.2295
-43	13.093390	353.835	311.765	13.093390	0.566461	0.5017009	604.1001
-38	12.203865	346.520	311.765	12.203865	0.528049	0.4744323	572.4188
10536	16.278340	267.200	311.765	16.278340	0.464915	0.5590612	692.5925
10612	16.047825	267.200	311.765	16.047825	0.503634	0.5976156	721.5474
10690	16.485350	266.450	311.765	16.485350	0.448163	0.5444287	683.5916
10762	16.975485	266.000	311.765	16.975485	0.435743	0.5340014	681.3420
10835	17.668380	265.550	311.765	17.668380	0.473725	0.5748204	723.9085
10904	15.477845	266.350	311.765	15.477845	0.524962	0.6201108	730.7646
10972	15.780770	266.200	311.765	15.780770	0.567718	0.6640917	769.2099
11044	17.062450	266.200	311.765	17.062450	0.422194	0.5200306	670.6569
11113	14.071460	264.800	311.765	14.071460	0.541849	0.6383245	724.7280
11187	16.074465	265.150	311.765	16.074465	0.490152	0.5891307	714.4391
11258	17.405490	264.400	311.765	17.405490	0.513015	0.6167806	755.3555
21048	9.612870	189.635	311.765	9.612870	0.481180	0.7958570	761.2478
21173	10.006380	189.225	311.765	10.006380	0.491841	0.8105213	775.3620
21301	10.426695	188.645	311.765	10.426695	0.430404	0.7523211	746.0397
21433	8.329884	186.235	311.765	8.329884	0.490850	0.8131384	746.7990
21574	11.400080	186.595	311.765	11.400080	0.417916	0.7538175	764.8965
21716	10.645230	186.595	311.765	10.645230	0.460863	0.7934012	776.6157
21866	8.680892	189.370	311.765	8.680892	0.455234	0.7656732	726.2887
22031	10.720585	189.080	311.765	10.720585	0.430449	0.7521747	751.2618
22197	9.247492	191.270	311.765	9.247492	0.408191	0.7127664	702.7205

PET with orbital parameters

Find orbital parameters

Selected samples and their orbital parameters:

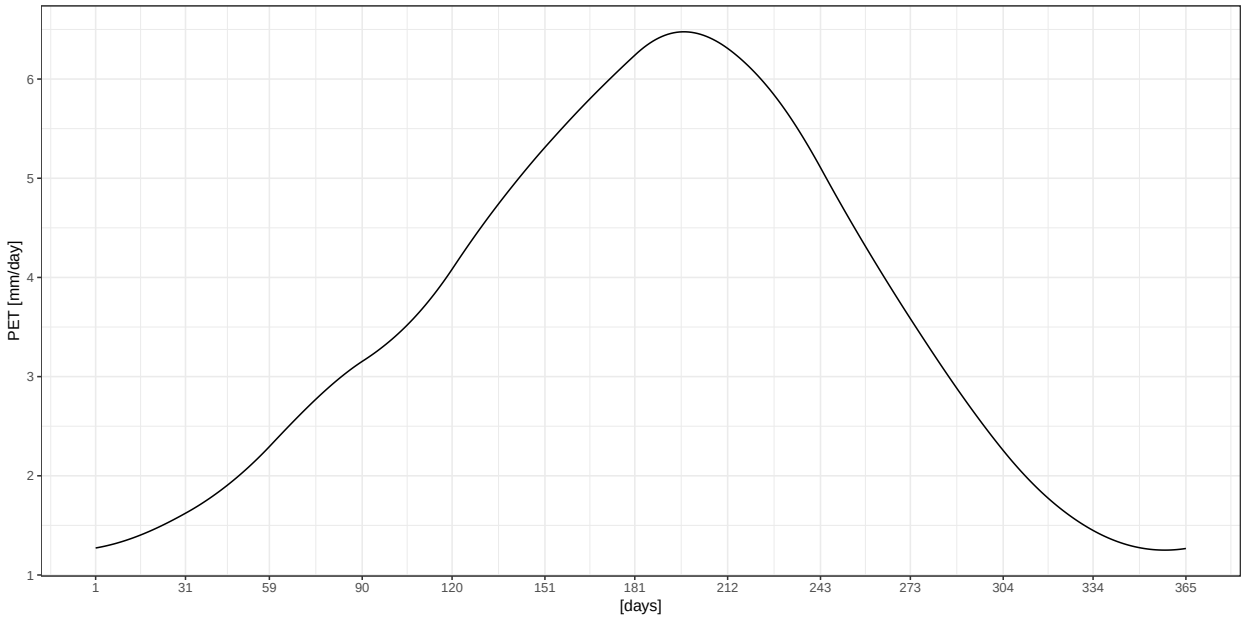
year	eps	ecc	varpi	epsp
-62	23.43821	0.0166988	283.10107	0.4211302
-56	23.43899	0.0167012	282.99828	0.4211293
-50	23.43977	0.0167037	282.89549	0.4211284
-43	23.44068	0.0167065	282.77558	0.4211273
6007	24.10588	0.0186835	180.75324	0.4138745
11044	24.19953	0.0195329	97.68662	0.4016794
21048	22.94125	0.0189846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



Plots

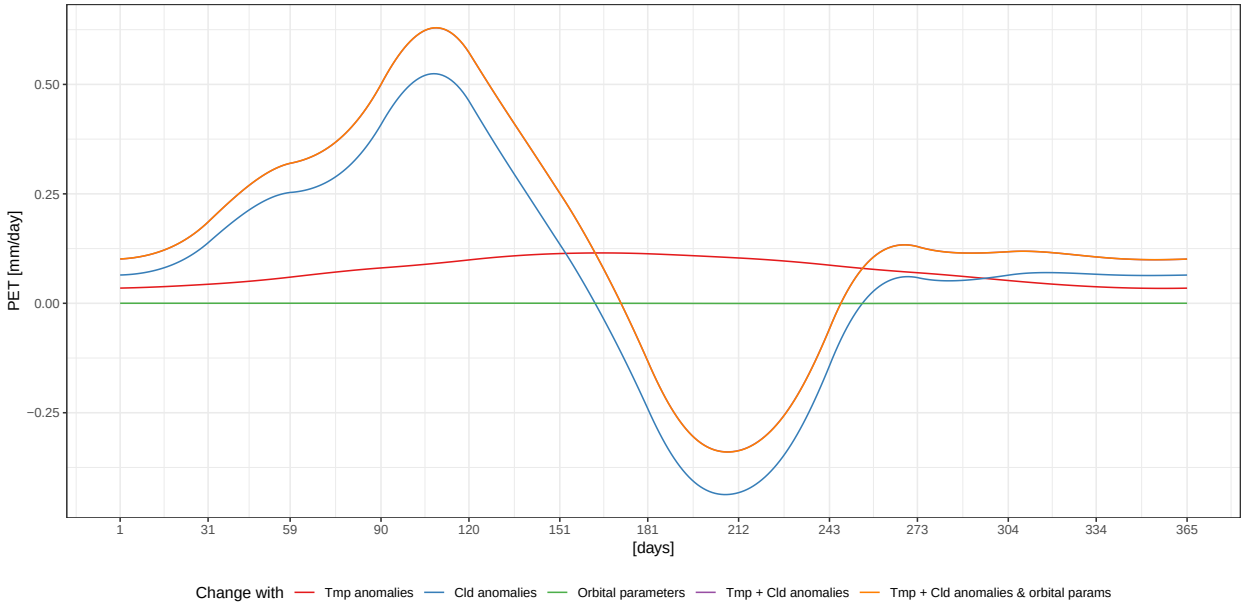
Modern PET

Obtained from CRU TS 4.04

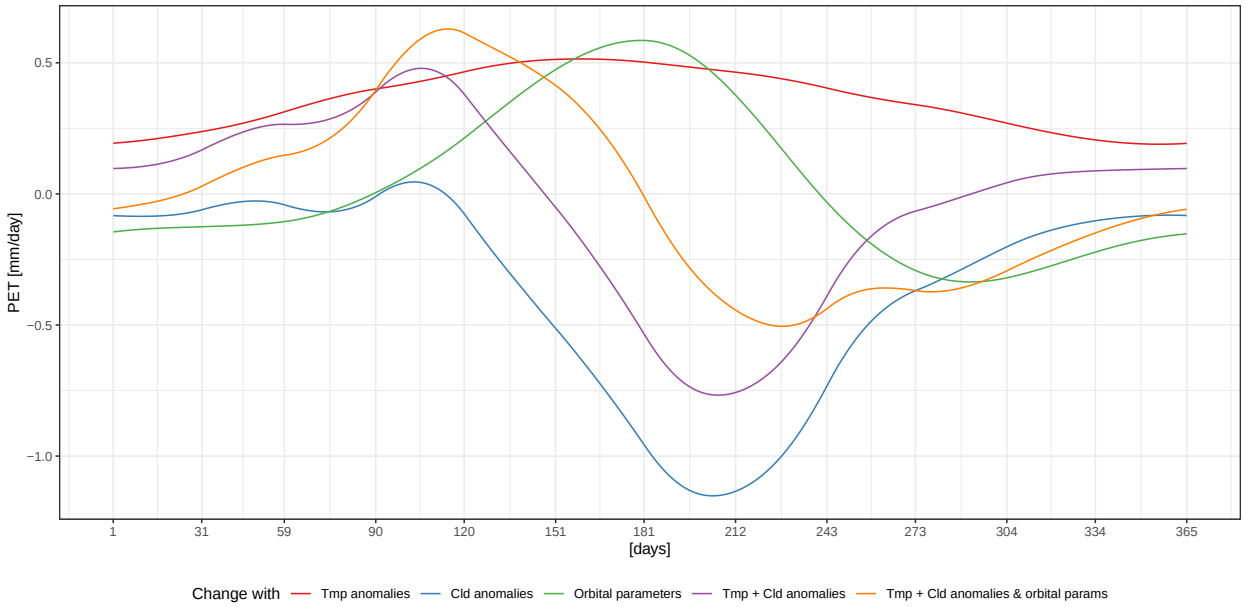


PET changes

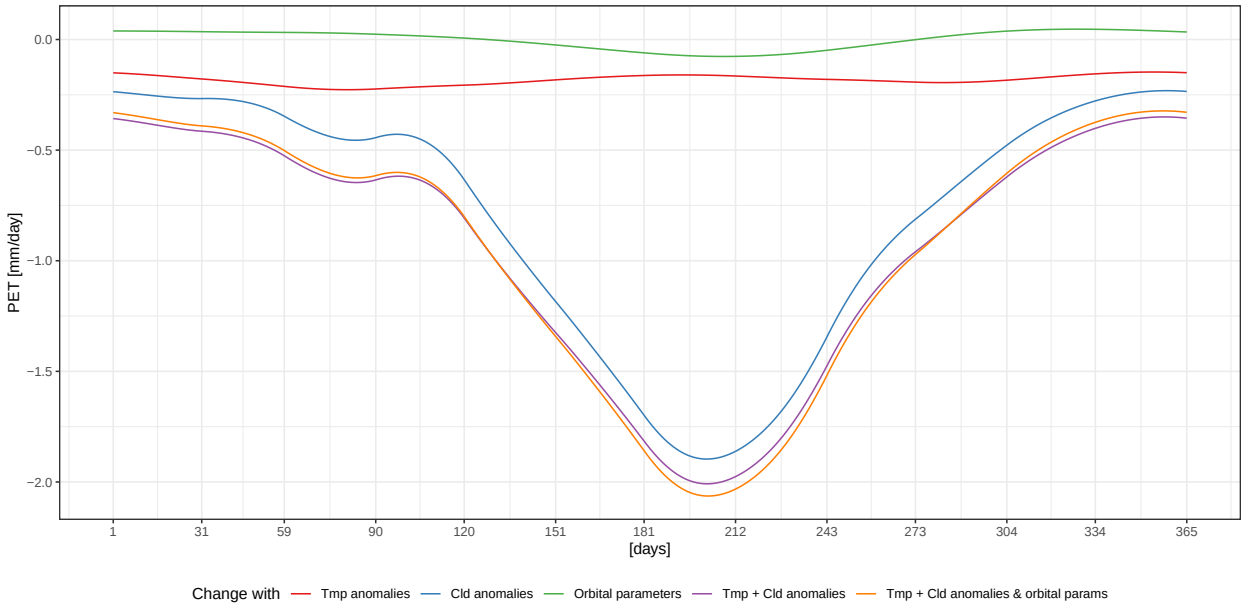
Padul: PET for age = -62 cal yr BP



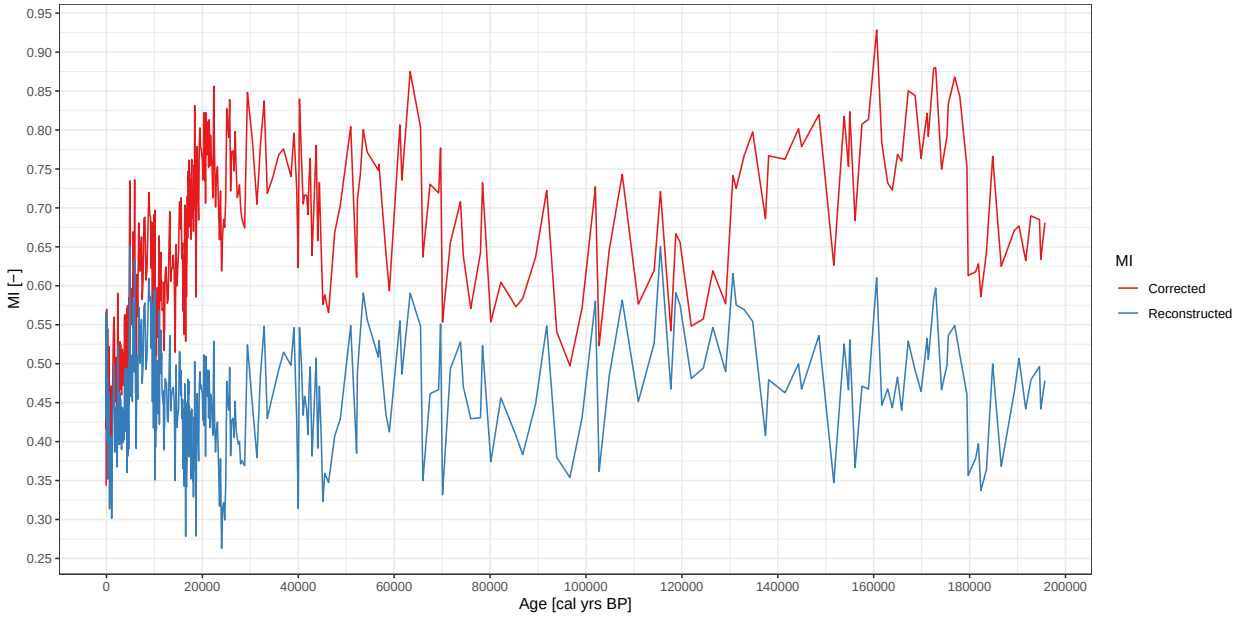
Padul: PET for age = 11044 cal yr BP



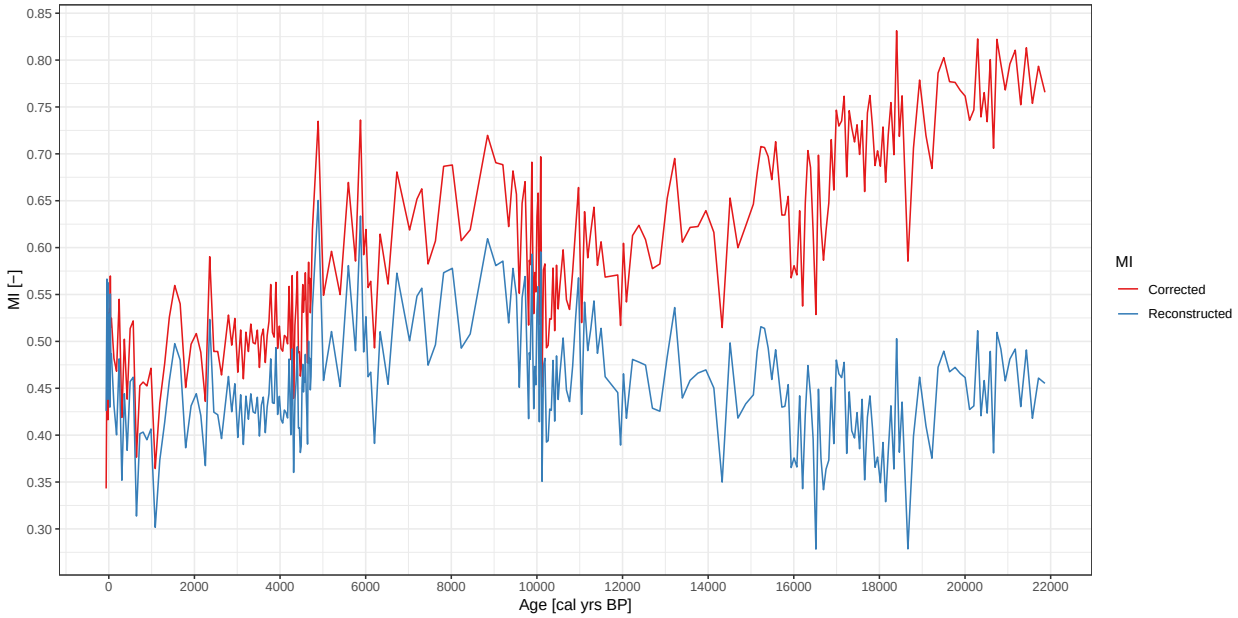
Padul: PET for age = 21048 cal yr BP



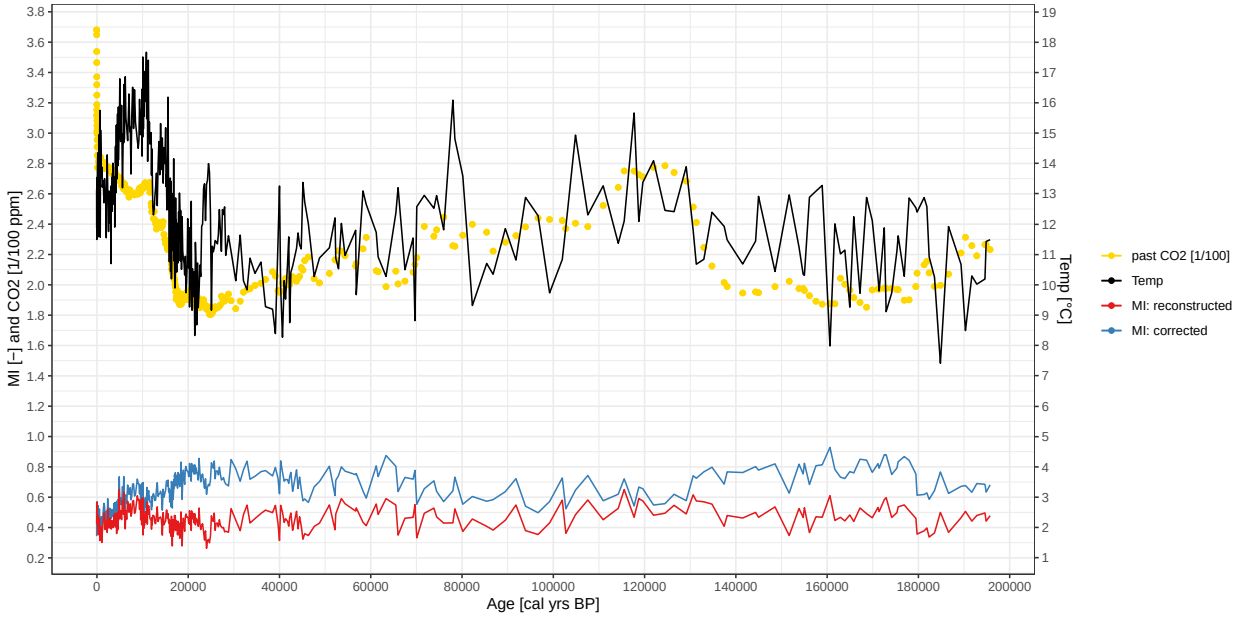
Reconstructed vs corrected MI: Past CO2 calculated using mean



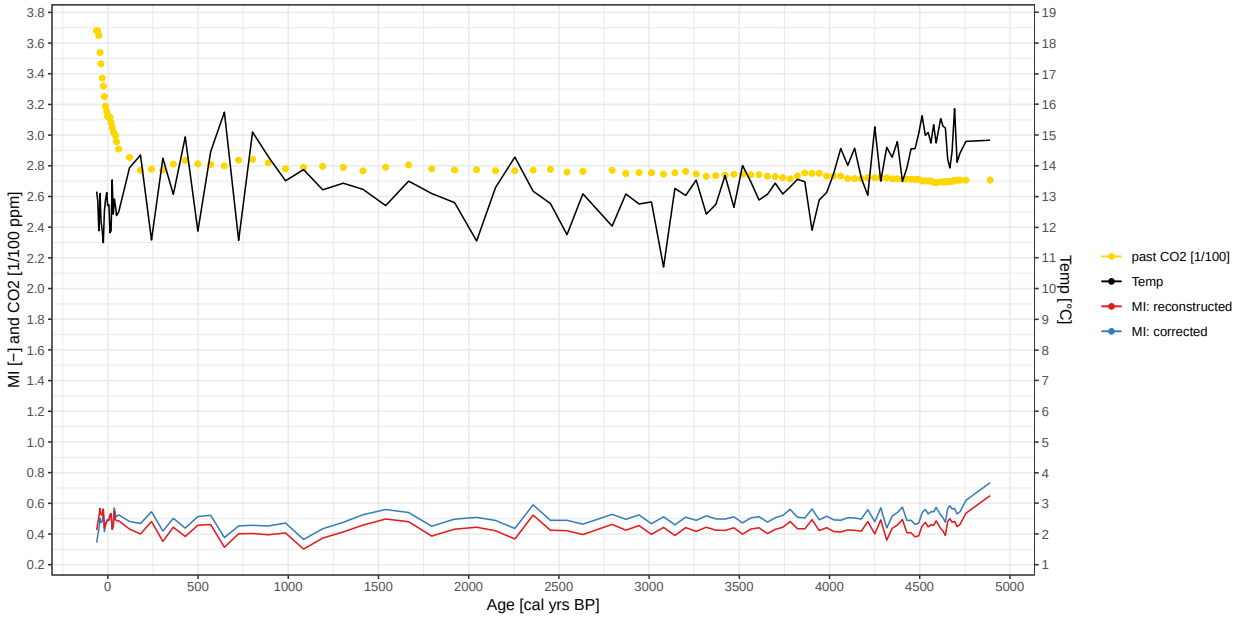
- age < 22k



Include past CO2 and Temperature



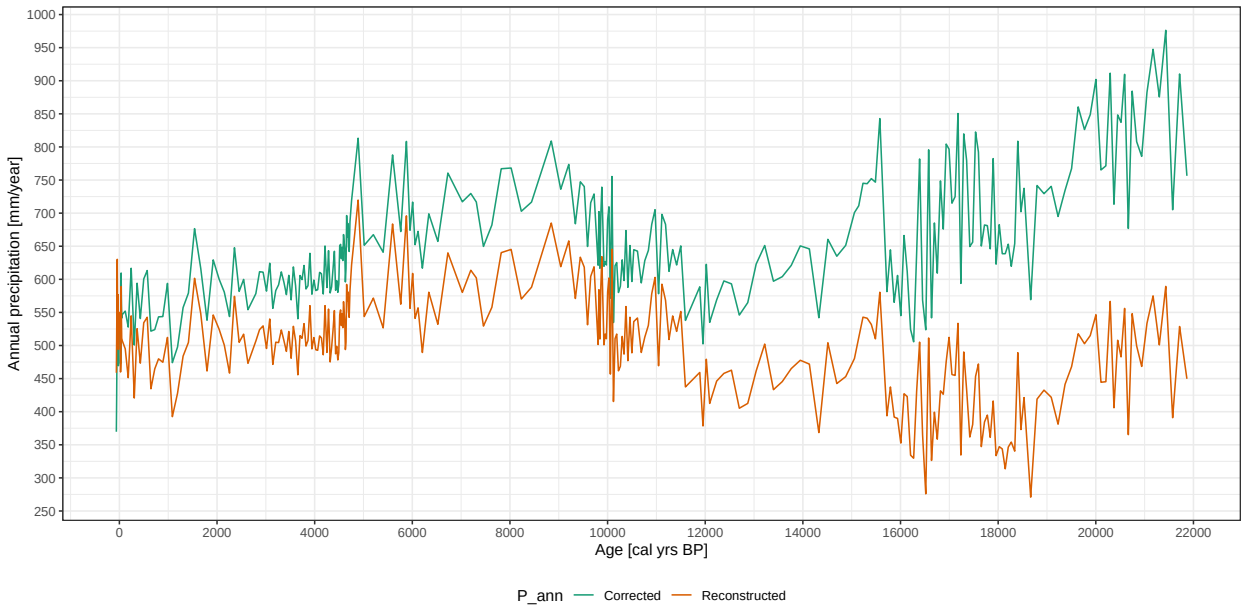
- `age < 5k`



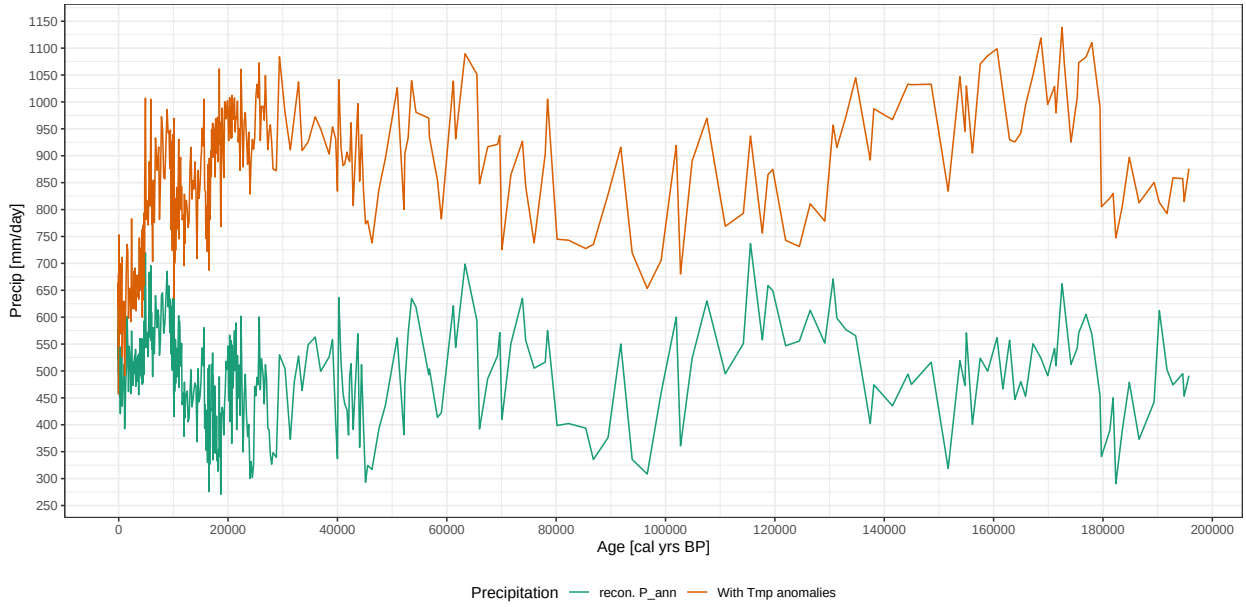
Reconstructed vs corrected `P_ann`: Past CO2 calculated using `mean`

With MI ratio

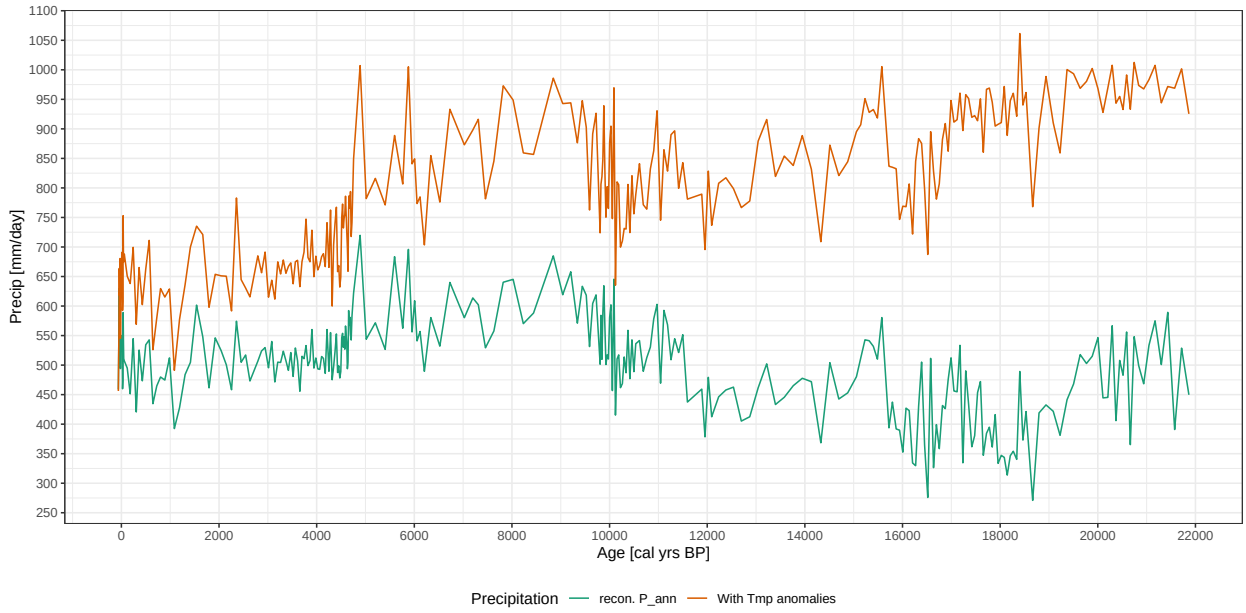
- `age < 22k`



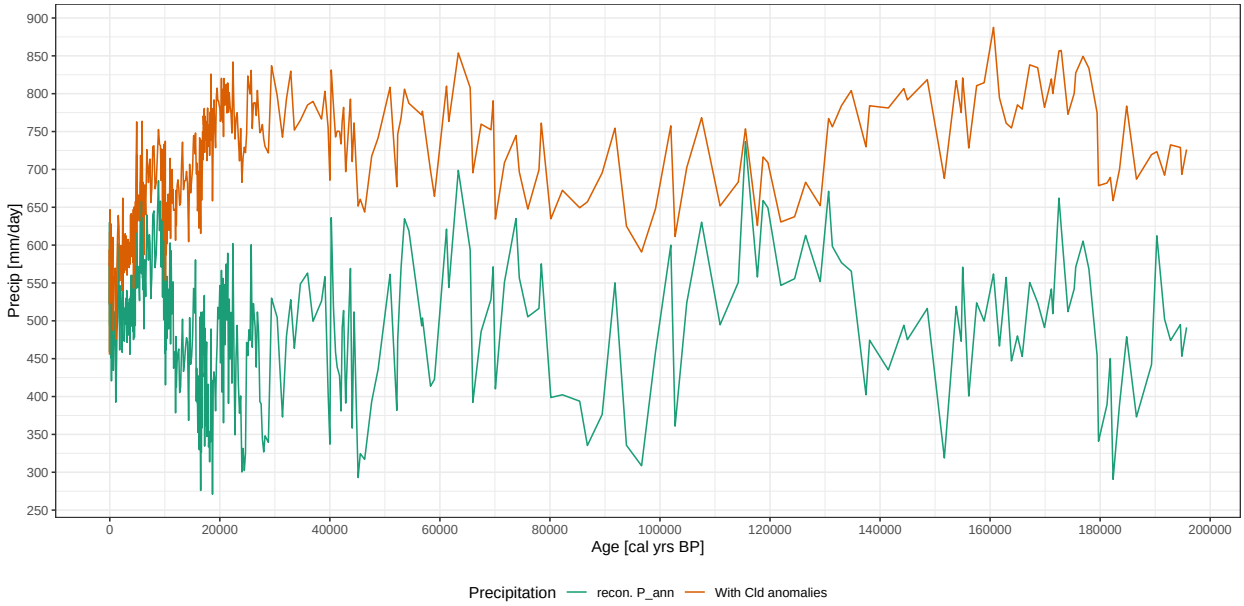
With temperature anomalies



`age < 22k`

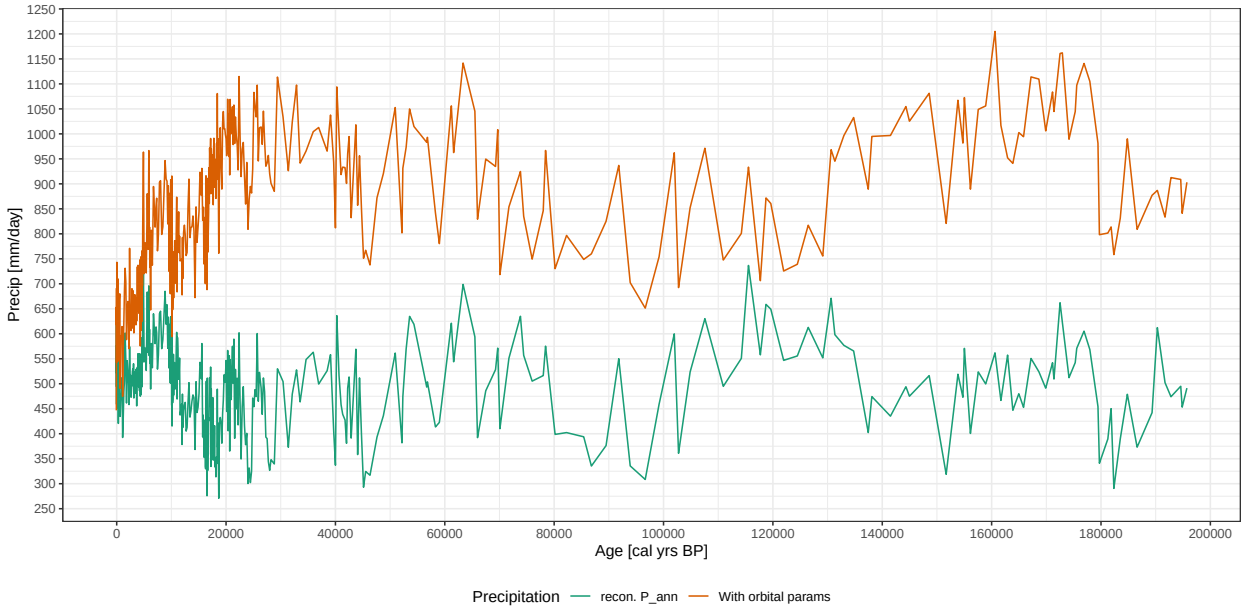


With cloud coverage anomalies



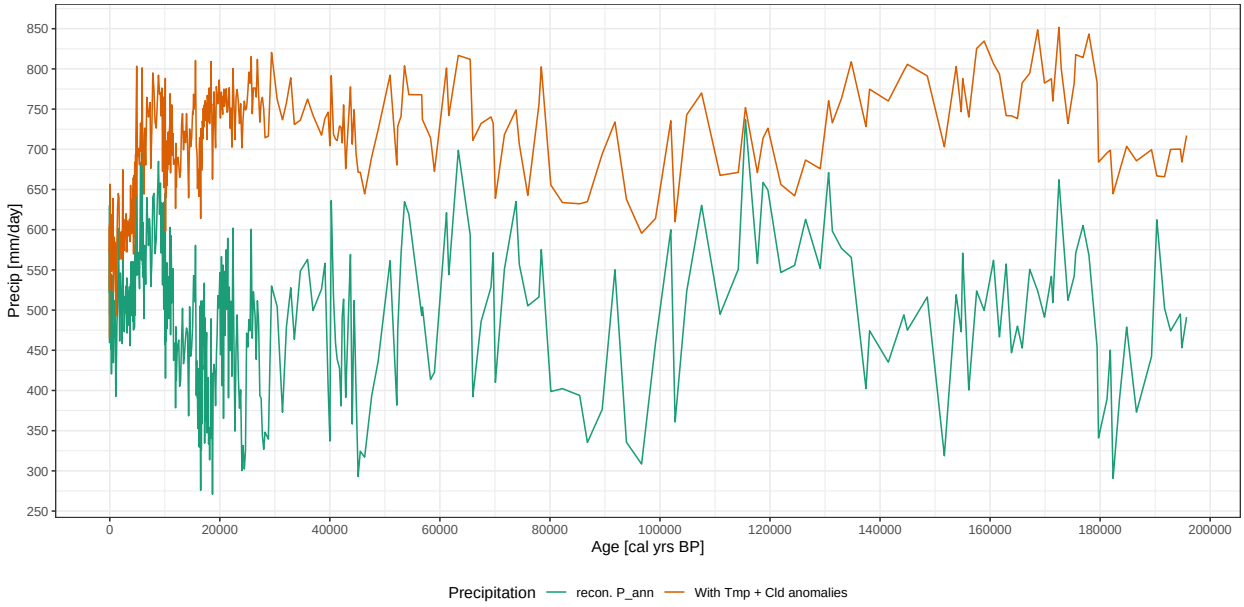
`age < 22k`

With orbital parameters

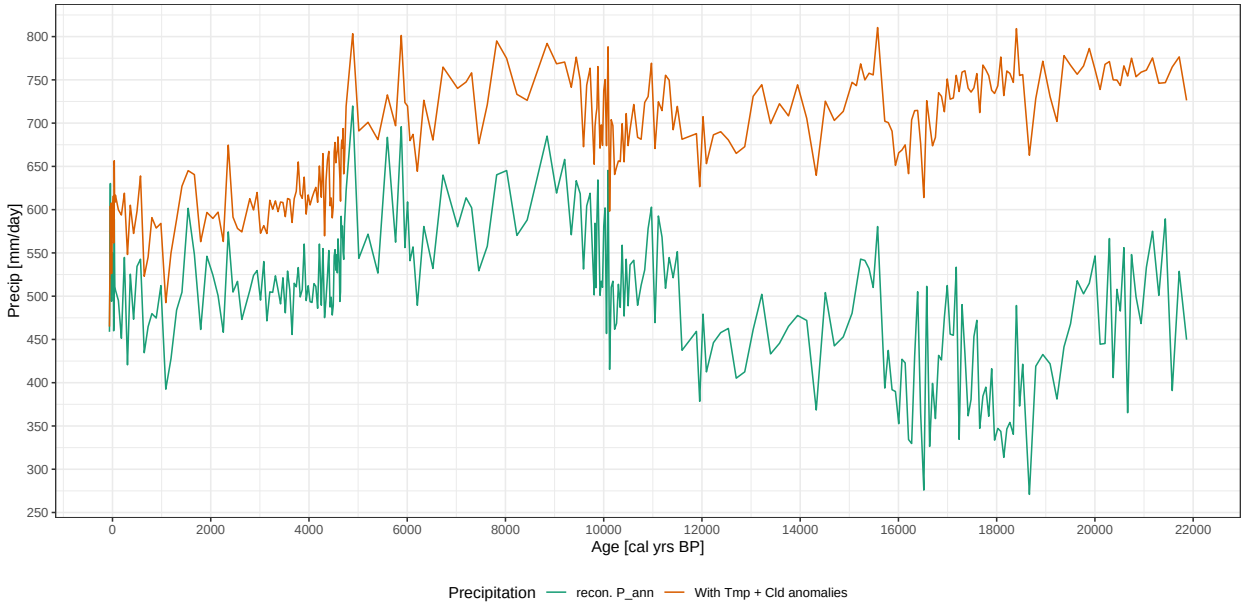


`age < 22k`

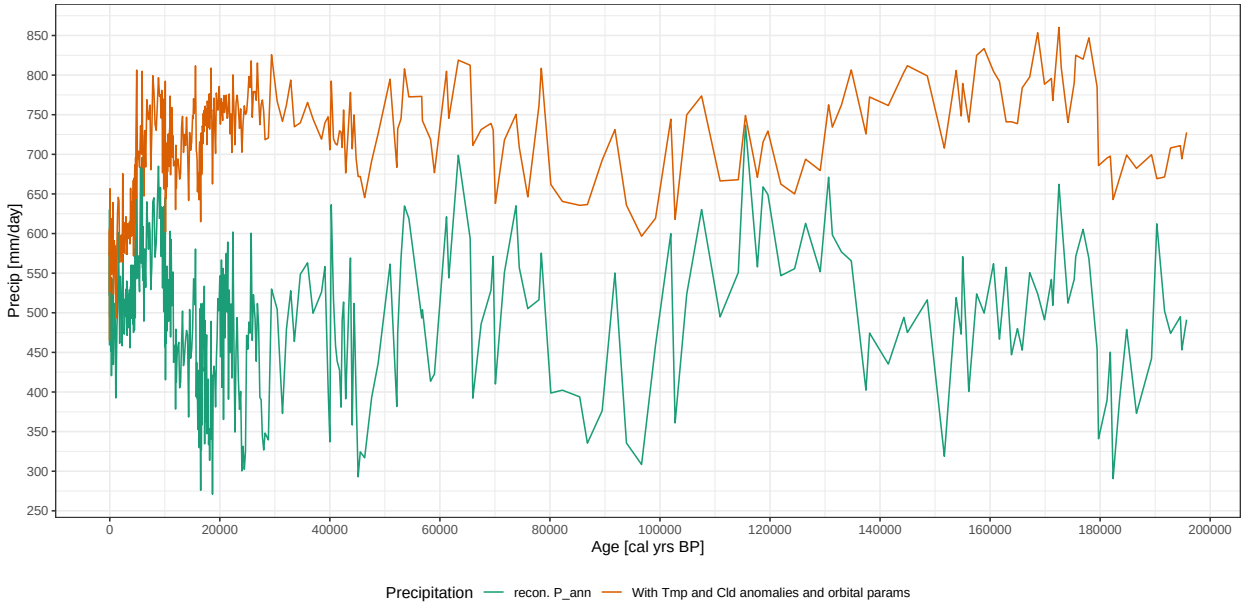
With temperature and cloud coverage anomalies



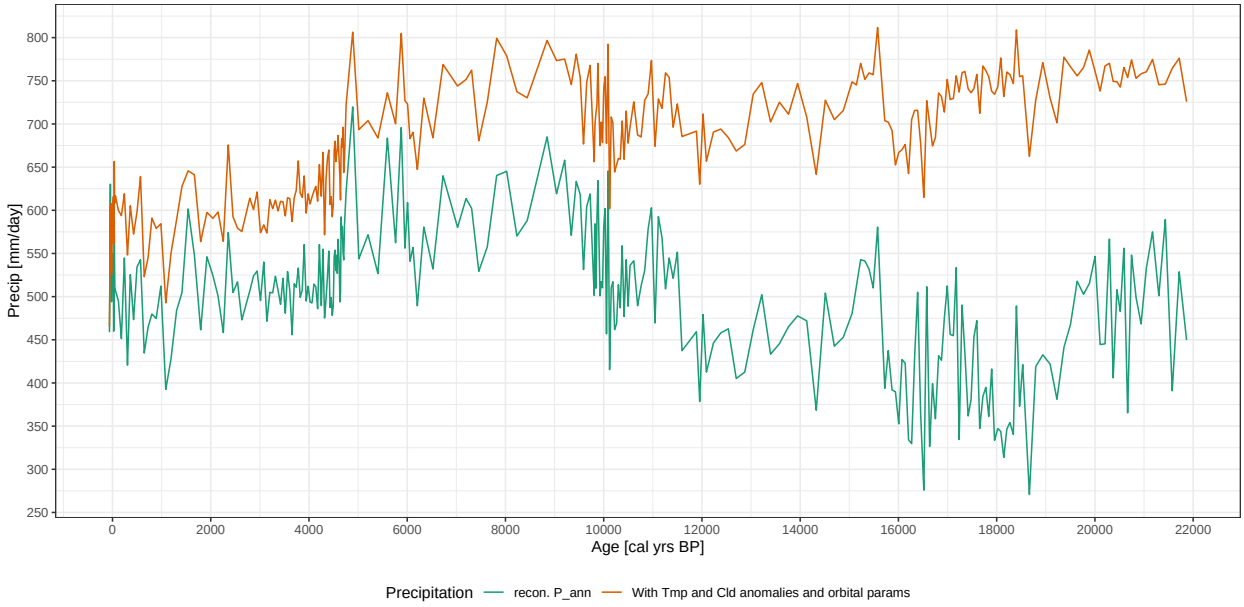
`age < 22k`



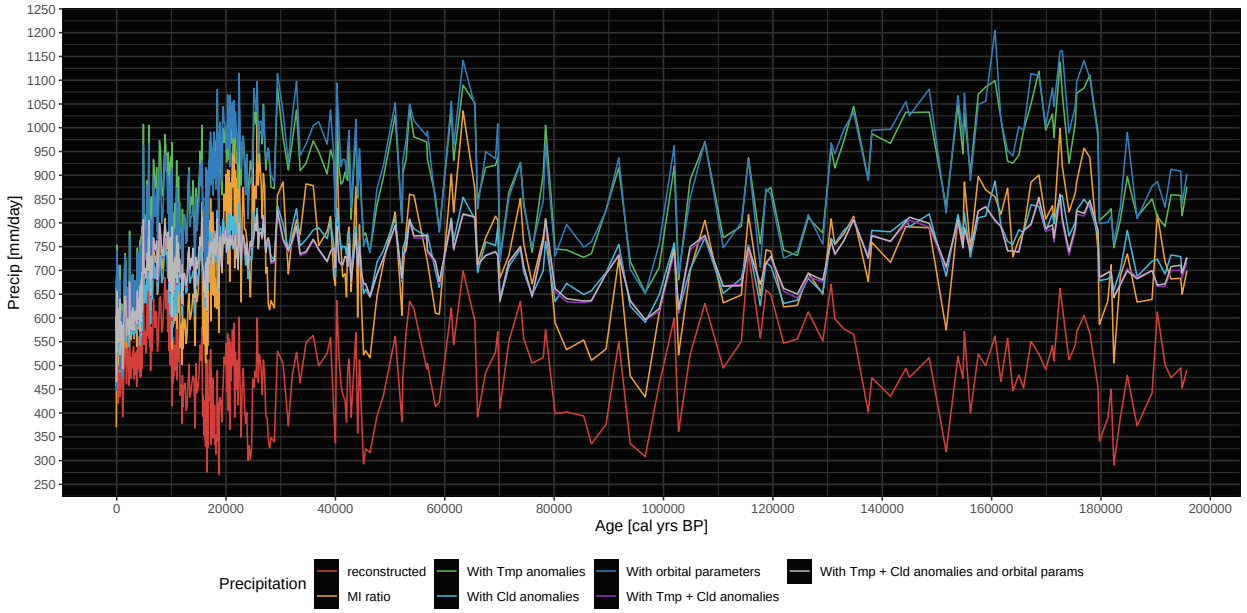
With temperature and cloud coverage anomalies and orbital parameters



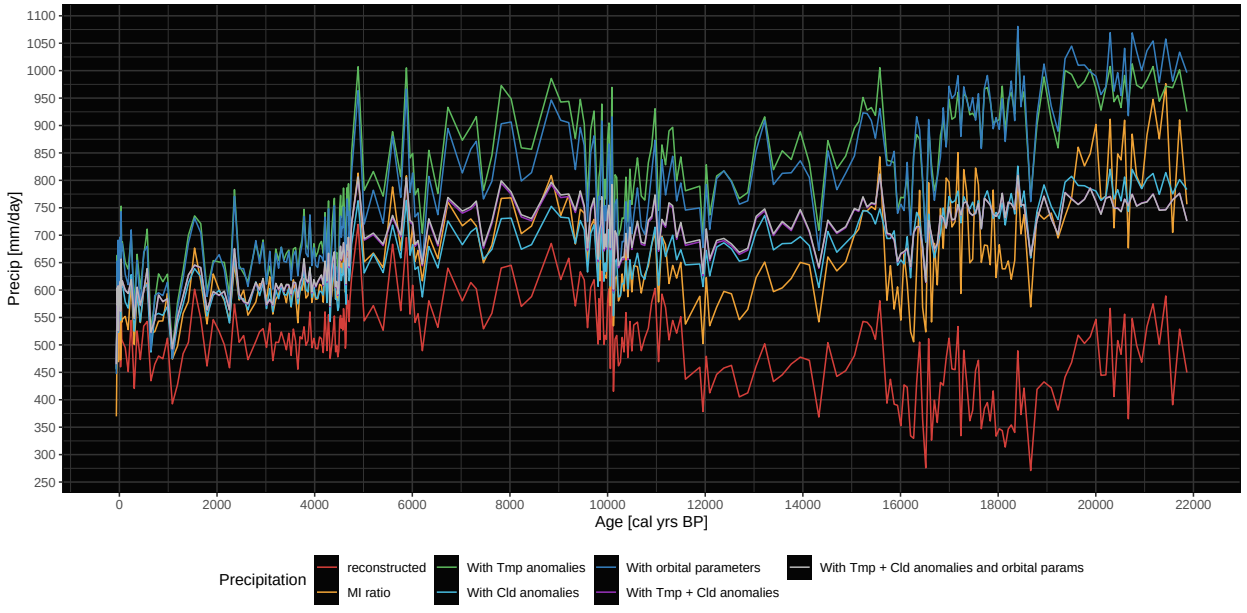
`age < 22k`



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.

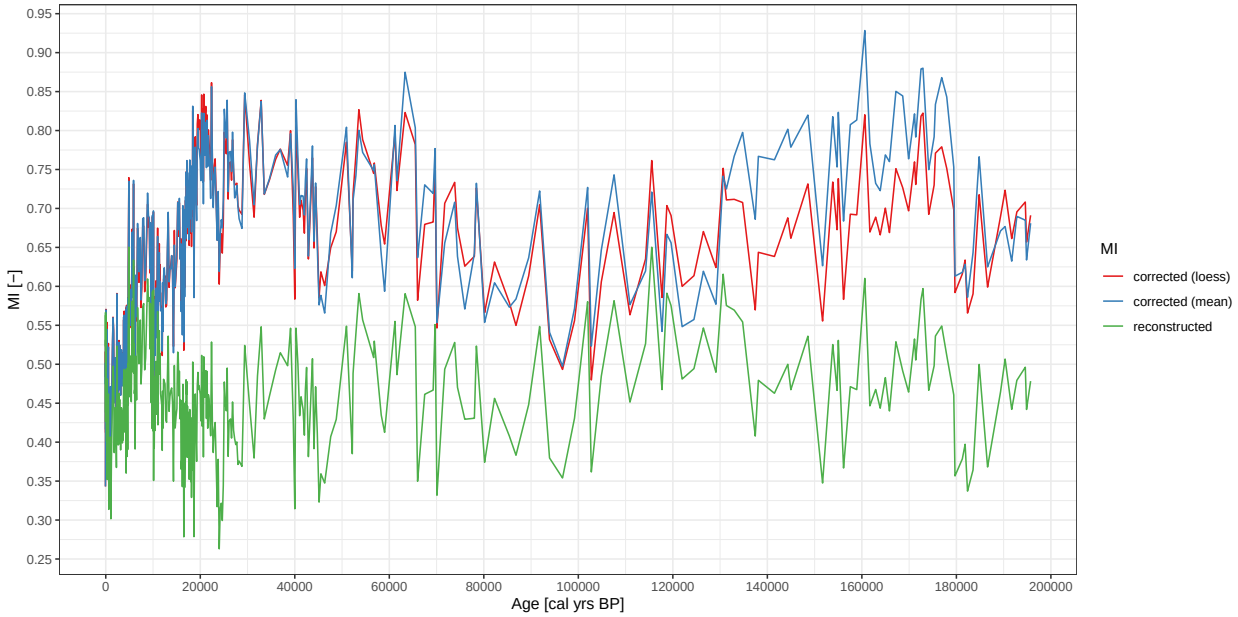
Appendix

A1. Find reconstructed MI using loess

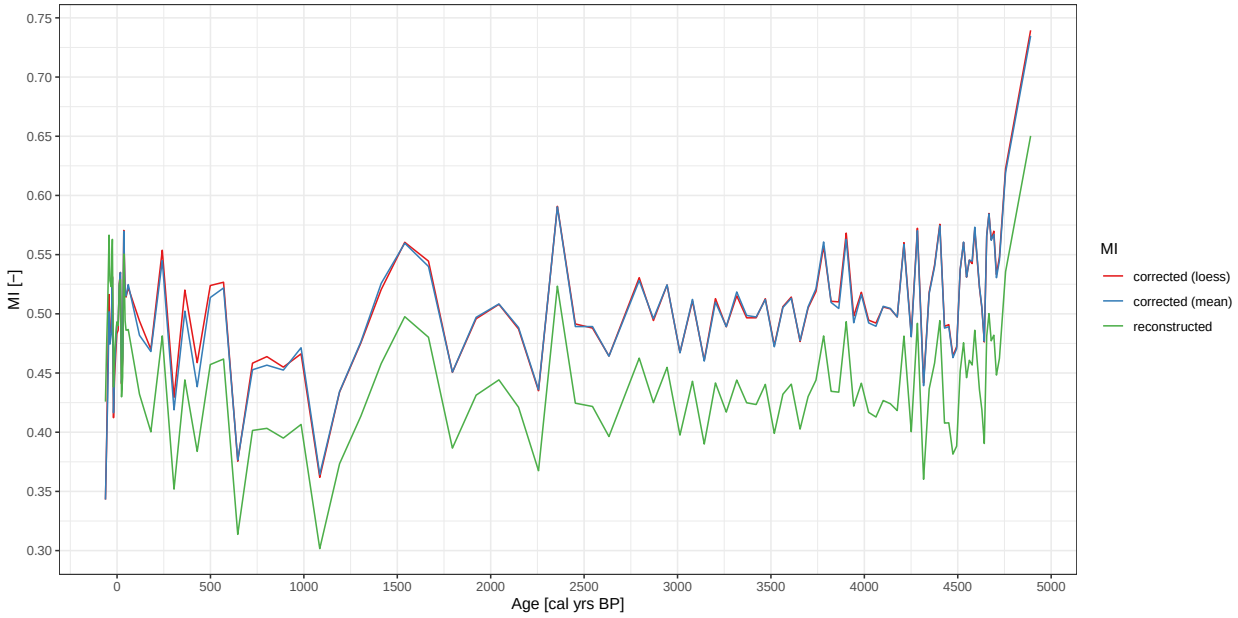
```
past_co2_loess <- function(age_calBP, ref = codos::ice_core) {
  # Extract the reference age and co2
  ref_age <- purrr::pluck(ref, 1)
  ref_co2 <- purrr::pluck(ref, 2)
  if (age_calBP < min(ref_age))
    return(ref_co2[which.min(ref_age)])

  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	past_co2_loess	corr_mi_loess
-62	13.15918	311.765	13.15918	0.425809	368.0200	0.3431377
-56	12.86272	311.765	12.86272	0.471798	368.0200	0.3892587
-50	11.88472	311.765	11.88472	0.506921	348.5771	0.4508257
-43	13.09339	311.765	13.09339	0.566461	343.4588	0.5162803
-38	12.20387	311.765	12.20387	0.528049	339.9523	0.4837723
-31	11.87980	311.765	11.87980	0.522880	335.2524	0.4857099
-25	11.49567	311.765	11.49567	0.562884	331.4182	0.5315462
-19	12.52563	311.765	12.52563	0.438233	327.7633	0.4122551
-13	12.88969	311.765	12.88969	0.468382	324.2577	0.4477184
-6	13.13016	311.765	13.13016	0.483879	320.3318	0.4694702

A2. Plot reconstructed vs corrected `MI` both approaches

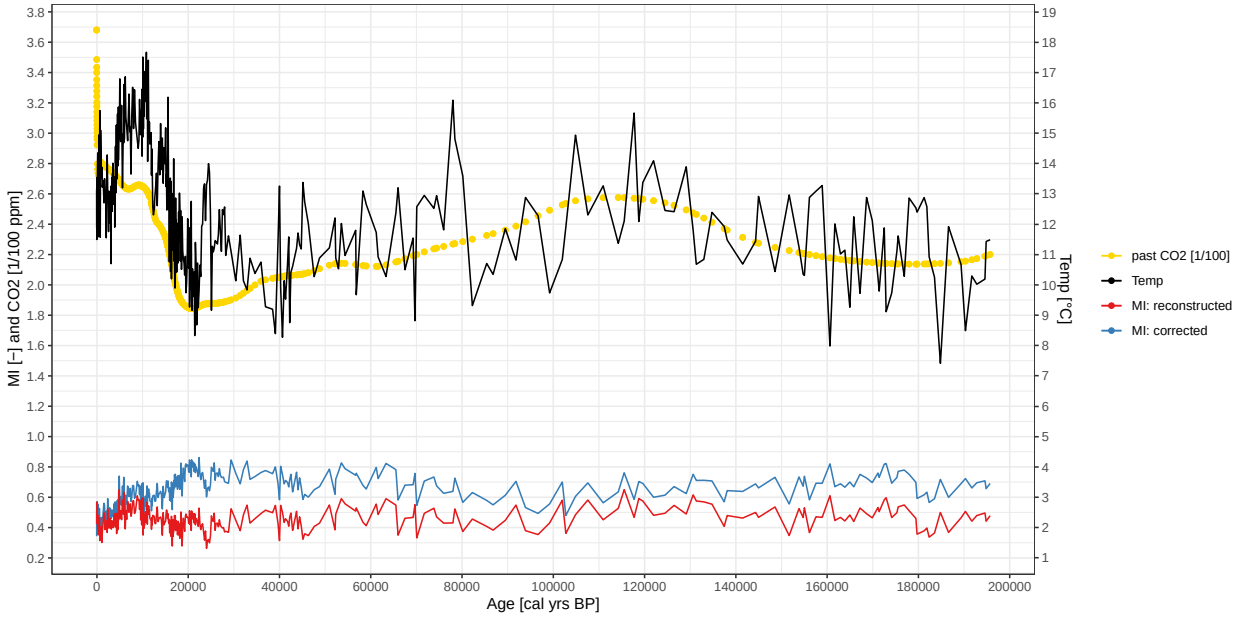


- `age < 5k`

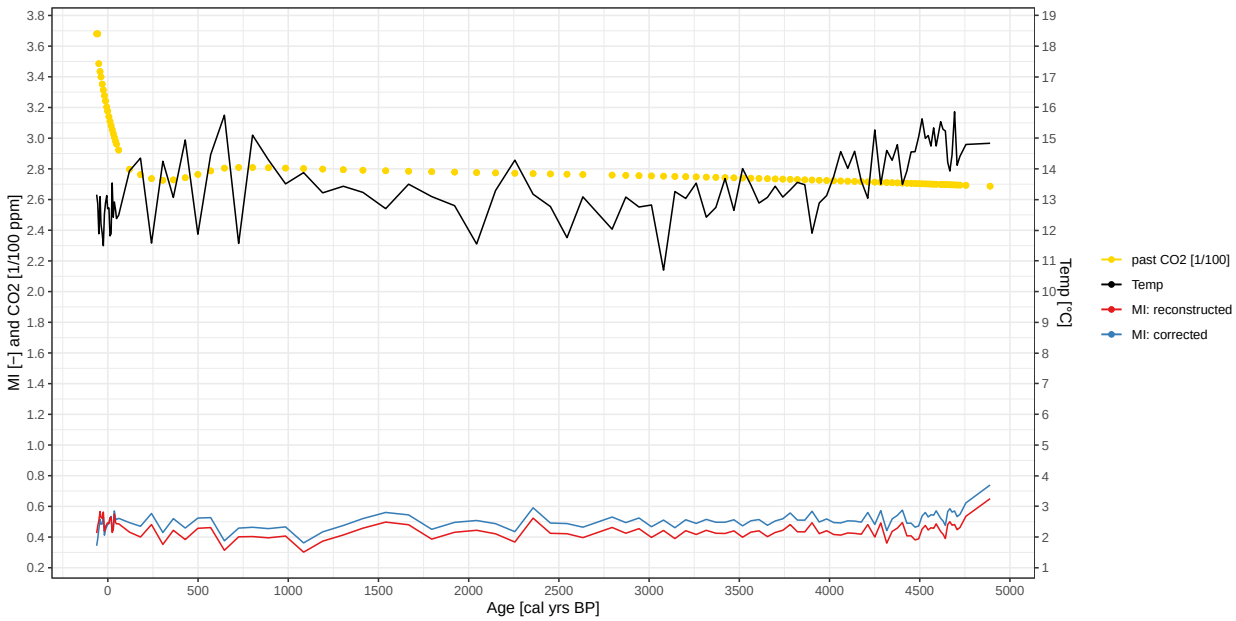


A3. Reconstructed vs corrected `MI`: Past CO2 calculated using `loess`

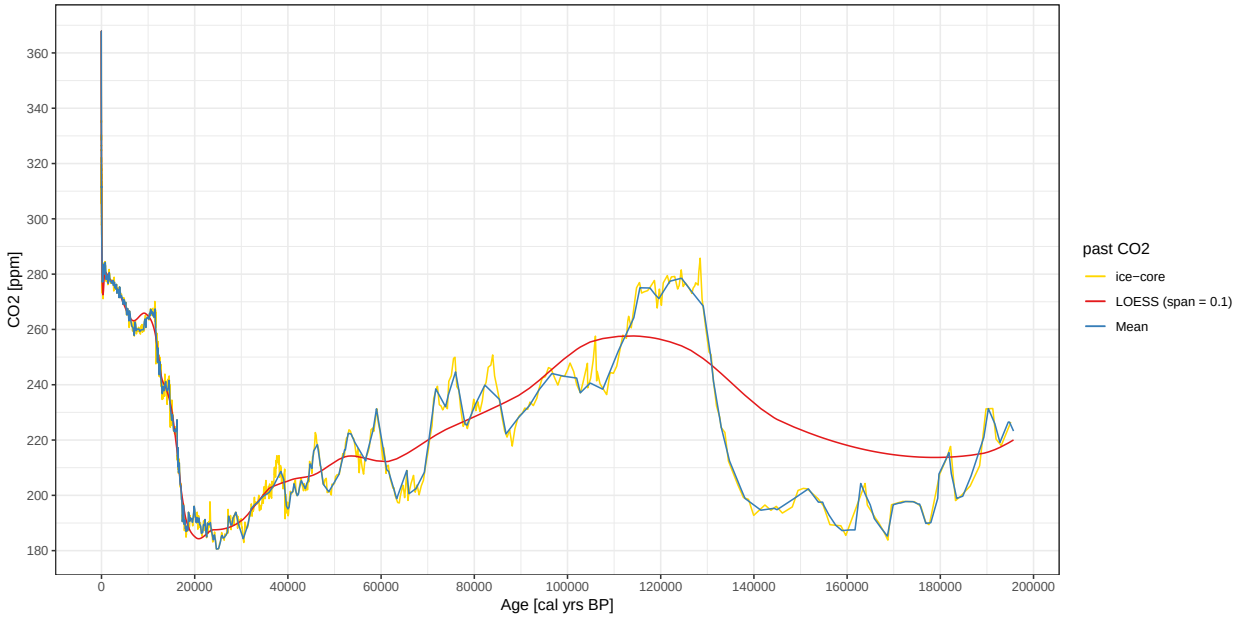
Include past CO2 and Temperature



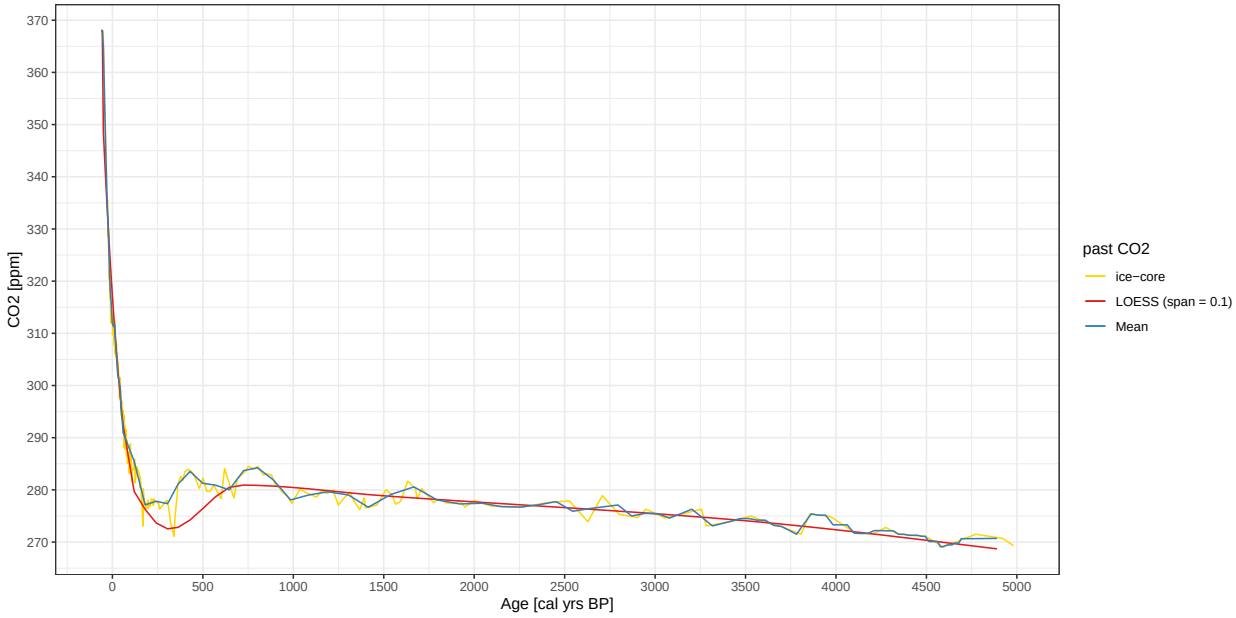
- `age < 5k`



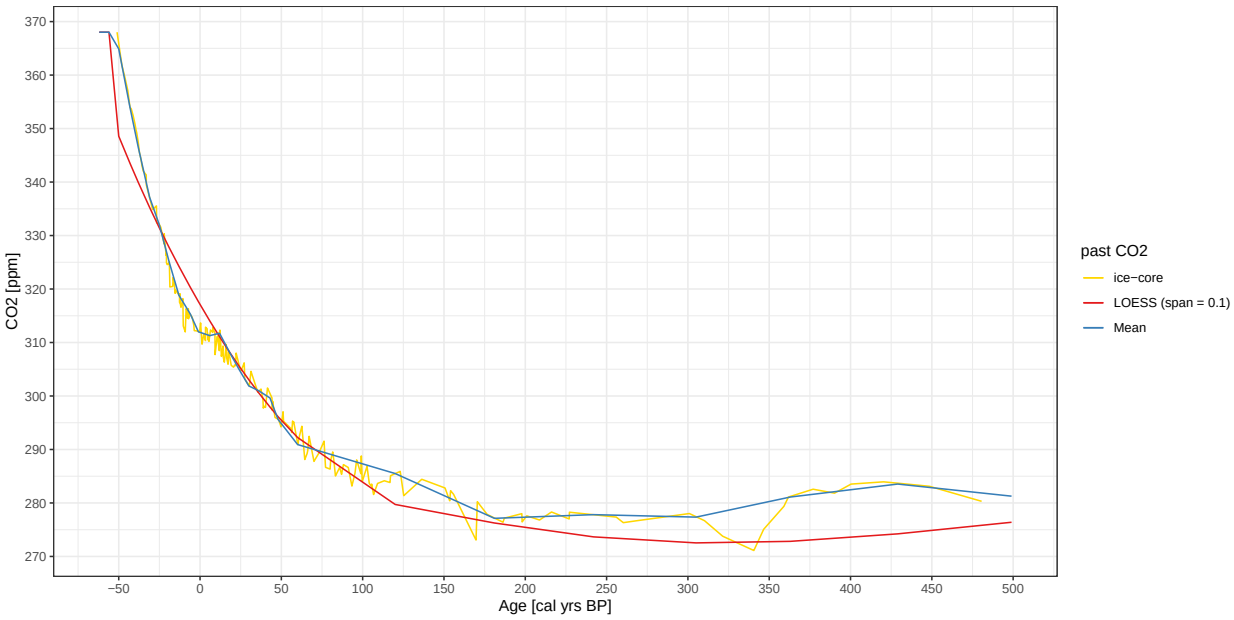
A4. Compare `codos::ice_core` vs past CO2 calculate using `mean` and `loess`



- `age < 5k`



- age < 500


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

A5. Padul Data

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

age_calBP	past_temp	past_co2	modern_co2	present_t	recon_mi	corr_mi	corr_P_ann
-62	13.159180	368.020	311.765	13.159180	0.425809	0.3431377	369.7292
-56	12.862720	368.020	311.765	12.862720	0.471798	0.3892587	417.9903
-50	11.884725	364.900	311.765	11.884725	0.506921	0.4293762	483.2929
-43	13.093390	353.835	311.765	13.093390	0.566461	0.5017009	558.1636
-38	12.203865	346.520	311.765	12.203865	0.528049	0.4744323	497.1948
-31	11.879800	337.155	311.765	11.879800	0.522880	0.4829125	481.5272
-25	11.495670	331.960	311.765	11.495670	0.562884	0.5307318	543.8519
-19	12.525630	325.080	311.765	12.525630	0.438233	0.4164441	469.5524
-13	12.889695	318.840	311.765	12.889695	0.468382	0.4564923	525.6344
-6	13.130160	315.340	311.765	13.130160	0.483879	0.4777764	543.2284
-1	12.701260	312.000	311.765	12.701260	0.493117	0.4927145	549.6090
6	12.724970	311.290	311.765	12.724970	0.490124	0.4909395	524.2047
12	11.815300	311.730	311.765	11.815300	0.524648	0.5247072	546.8137
18	11.888230	308.260	311.765	11.888230	0.528909	0.5349146	546.4380
24	13.540305	304.970	311.765	13.540305	0.429877	0.4418854	472.8426
30	12.423860	301.880	311.765	12.423860	0.446556	0.4638791	491.7552
36	12.921615	301.000	311.765	12.921615	0.550525	0.5697481	609.5397
43	12.653010	299.630	311.765	12.653010	0.494339	0.5159135	559.5639
48	12.378860	295.610	311.765	12.378860	0.486138	0.5150739	541.3638
60	12.490615	290.920	311.765	12.490615	0.486739	0.5247127	546.6935
120	13.932820	285.500	311.765	13.932820	0.432149	0.4818933	551.9924
181	14.350570	277.130	311.765	14.350570	0.400314	0.4681291	527.8342
242	11.581430	277.815	311.765	11.581430	0.481347	0.5449170	616.7081
305	14.247445	277.355	311.765	14.247445	0.351935	0.4188929	500.7159
363	13.068665	281.110	311.765	13.068665	0.444194	0.5022595	594.0809
429	14.941955	283.535	311.765	14.941955	0.383781	0.4384079	540.7695
499	11.871105	281.270	311.765	11.871105	0.457146	0.5137634	600.5729
570	14.464090	280.910	311.765	14.464090	0.461804	0.5218460	613.2925
646	15.748480	280.005	311.765	15.748480	0.313710	0.3765371	521.6943
725	11.569615	283.690	311.765	11.569615	0.401503	0.4527444	524.0520
802	15.099470	284.240	311.765	15.099470	0.403256	0.4566272	543.3494
890	14.293475	281.905	311.765	14.293475	0.395018	0.4524686	543.7314

985	13.511010	278.075	311.765	13.511010	0.406559	0.4713522	593.8407
1085	13.877625	279.020	311.765	13.877625	0.301657	0.3643607	474.1145
1191	13.218835	279.640	311.765	13.218835	0.373369	0.4343624	497.6724
1305	13.432900	279.020	311.765	13.432900	0.413576	0.4762967	557.3203
1414	13.233040	276.675	311.765	13.233040	0.458016	0.5257437	579.2379
1540	12.702920	279.130	311.765	12.702920	0.497576	0.5596509	676.6062
1667	13.501385	280.575	311.765	13.501385	0.480201	0.5399952	616.3591
1795	13.096470	278.070	311.765	13.096470	0.386541	0.4507779	538.1963
1922	12.799950	277.300	311.765	12.799950	0.431293	0.4970448	629.3891
2044	11.551290	277.450	311.765	11.551290	0.444219	0.5083445	600.0726
2149	13.294700	276.800	311.765	13.294700	0.421076	0.4884249	580.6893
2256	14.283885	276.700	311.765	14.283885	0.367480	0.4359882	543.7561
2357	13.174110	277.150	311.765	13.174110	0.523369	0.5903218	647.7491
2453	12.771775	277.750	311.765	12.771775	0.424511	0.4892421	581.7347
2545	11.757505	275.900	311.765	11.757505	0.421738	0.4892306	599.8794
2633	13.088010	276.400	311.765	13.088010	0.396330	0.4641710	554.0819
2795	12.033940	277.100	311.765	12.033940	0.462588	0.5280560	578.3573
2871	13.081115	275.000	311.765	13.081115	0.424956	0.4959593	611.5087
2944	12.756910	275.500	311.765	12.756910	0.454794	0.5244708	610.8528
3013	12.822585	275.450	311.765	12.822585	0.397566	0.4671378	582.1615
3080	10.699305	274.600	311.765	10.699305	0.443022	0.5121733	624.3221
3143	13.261510	275.450	311.765	13.261510	0.390003	0.4600726	556.1728
3203	13.035830	276.300	311.765	13.035830	0.441610	0.5098298	583.0088
3261	13.535495	274.700	311.765	13.535495	0.416972	0.4891640	591.7275
3317	12.425060	273.100	311.765	12.425060	0.444067	0.5184801	611.2647
3370	12.743310	273.550	311.765	12.743310	0.424860	0.4985937	595.5617
3421	13.684420	274.000	311.765	13.684420	0.423377	0.4973401	576.8883
3470	12.647450	274.500	311.765	12.647450	0.440416	0.5120469	606.0141
3518	14.010410	274.500	311.765	14.010410	0.399001	0.4721596	568.9496
3564	13.475130	274.200	311.765	13.475130	0.432065	0.5053581	618.7237
3609	12.885270	274.200	311.765	12.885270	0.440593	0.5131740	590.7185
3656	13.071425	273.200	311.765	13.071425	0.402640	0.4774438	540.3971
3699	13.434470	273.000	311.765	13.434470	0.430108	0.5059883	605.8088
3741	13.080005	272.250	311.765	13.080005	0.444006	0.5211480	599.5539

3782	13.312910	271.500	311.765	13.312910	0.481336	0.5606862	620.9429
3822	13.559430	273.450	311.765	13.559430	0.434527	0.5096020	585.3749
3863	13.483015	275.400	311.765	13.483015	0.433829	0.5045098	590.3579
3903	11.902960	275.150	311.765	11.902960	0.493315	0.5629266	639.2794
3943	12.888460	275.150	311.765	12.888460	0.422033	0.4924579	577.5052
3984	13.129820	273.300	311.765	13.129820	0.441372	0.5162450	598.8846
4023	13.747505	273.300	311.765	13.747505	0.416761	0.4923252	583.0277
4062	14.563010	273.300	311.765	14.563010	0.412826	0.4895032	584.2709
4101	14.015225	271.700	311.765	14.015225	0.426782	0.5063674	610.4772
4139	14.572930	271.650	311.765	14.572930	0.424069	0.5045734	608.4391
4176	13.604615	271.650	311.765	13.604615	0.418275	0.4973352	577.8375
4212	13.041955	272.200	311.765	13.041955	0.481193	0.5586044	650.3564
4251	15.268020	272.200	311.765	15.268020	0.400423	0.4805779	587.5819
4284	13.499280	272.150	311.765	13.499280	0.491962	0.5701756	643.2483
4317	14.600530	272.150	311.765	14.600530	0.360241	0.4392750	579.4502
4347	14.278675	271.500	311.765	14.278675	0.436612	0.5170945	588.6141
4376	14.787685	271.500	311.765	14.787685	0.458481	0.5398572	615.7771
4404	13.491295	271.300	311.765	13.491295	0.494253	0.5743814	642.3585
4429	13.935795	271.300	311.765	13.935795	0.407680	0.4879428	583.4416
4452	14.553305	271.300	311.765	14.553305	0.407926	0.4891058	598.0775
4474	14.558790	271.100	311.765	14.558790	0.381470	0.4629580	580.3511
4494	15.045370	271.100	311.765	15.045370	0.388216	0.4704919	592.7360
4513	15.631435	270.100	311.765	15.631435	0.451673	0.5376181	650.4651
4531	14.992585	270.100	311.765	14.992585	0.475532	0.5605811	652.8178
4547	15.086240	270.100	311.765	15.086240	0.446055	0.5310723	631.1111
4562	14.741750	270.100	311.765	14.741750	0.460775	0.5453329	648.3659
4577	15.337330	269.100	311.765	15.337330	0.456752	0.5446023	628.3163
4591	14.744645	269.100	311.765	14.744645	0.486113	0.5731684	667.5965
4616	15.537315	269.450	311.765	15.537315	0.435921	0.5231466	646.0028
4629	15.289300	269.450	311.765	15.289300	0.418996	0.5057000	596.0980
4642	15.236480	269.450	311.765	15.236480	0.390457	0.4768931	616.7645
4655	14.217500	269.800	311.765	14.217500	0.481282	0.5658395	696.3601
4667	13.929305	269.800	311.765	13.929305	0.500180	0.5844095	663.5931
4679	14.456340	269.800	311.765	14.456340	0.477212	0.5621175	684.5081

4693	15.862295	270.650	311.765	15.862295	0.481918	0.5671334	649.4017
4707	14.117130	270.650	311.765	14.117130	0.448255	0.5305052	642.0597
4723	14.411470	270.650	311.765	14.411470	0.462332	0.5451134	686.9757
4756	14.795020	270.650	311.765	14.795020	0.535625	0.6194448	719.0891
4890	14.834370	270.700	311.765	14.834370	0.650277	0.7347375	813.2034
5015	16.790890	268.950	311.765	16.790890	0.458337	0.5491130	651.4328
5202	14.724575	269.800	311.765	14.724575	0.510507	0.5960443	667.4811
5403	15.916575	265.300	311.765	15.916575	0.451895	0.5499238	640.8843
5596	13.197670	267.600	311.765	13.197670	0.580824	0.6695068	787.9463
5763	14.989795	265.700	311.765	14.989795	0.490060	0.5856527	672.1597
5879	14.690215	263.100	311.765	14.690215	0.633639	0.7360496	808.3443
5953	16.610490	263.700	311.765	16.610490	0.488720	0.5924005	674.1682
6007	14.797680	266.700	311.765	14.797680	0.526236	0.6193303	716.6286
6056	15.365505	266.100	311.765	15.365505	0.462299	0.5574160	652.2830
6118	15.526410	265.500	311.765	15.526410	0.467143	0.5640493	672.4718
6206	16.861230	264.350	311.765	16.861230	0.391183	0.4930179	616.8613
6338	15.520625	262.700	311.765	15.520625	0.510261	0.6143791	698.9936
6523	15.196245	261.150	311.765	15.196245	0.454215	0.5611141	657.2725
6729	14.751830	260.750	311.765	14.751830	0.572781	0.6806975	760.5752
7025	16.292160	257.850	311.765	16.292160	0.500633	0.6187738	717.1444
7198	15.048425	262.650	311.765	15.048425	0.548170	0.6517564	729.6920
7311	15.212085	261.850	311.765	15.212085	0.556734	0.6627064	716.8386
7457	13.652665	259.550	311.765	13.652665	0.474606	0.5825392	649.6801
7630	15.563800	260.100	311.765	15.563800	0.496452	0.6071028	682.0790
7821	16.512985	260.050	311.765	16.512985	0.573211	0.6867157	767.0798
8024	15.154520	260.200	311.765	15.154520	0.577937	0.6881135	768.1767
8233	16.430325	259.300	311.765	16.430325	0.492751	0.6073579	702.8192
8442	15.368730	259.800	311.765	15.368730	0.507928	0.6190148	716.7062
8847	14.772840	259.950	311.765	14.772840	0.609482	0.7197430	808.9607
9040	14.501085	259.850	311.765	14.501085	0.580817	0.6905417	736.0914
9205	14.772915	262.850	311.765	14.772915	0.585610	0.6884426	773.6065
9340	16.114460	263.750	311.765	16.114460	0.519646	0.6224092	683.9392
9441	15.439775	262.900	311.765	15.439775	0.577847	0.6818112	747.3933
9522	14.951680	260.750	311.765	14.951680	0.548766	0.6569032	740.1655

9589	15.205050	263.800	311.765	15.205050	0.450967	0.5513035	649.6028
9654	15.017930	263.800	311.765	15.017930	0.546659	0.6473353	715.7067
9723	15.199465	263.800	311.765	15.199465	0.569147	0.6703363	728.9550
9806	15.815015	264.400	311.765	15.815015	0.417580	0.5173799	621.3341
9823	14.884225	264.400	311.765	14.884225	0.487888	0.5864207	702.2738
9843	16.120400	264.400	311.765	16.120400	0.480904	0.5817688	616.7231
9862	14.437820	264.400	311.765	14.437820	0.524941	0.6229166	699.2746
9882	14.242735	264.400	311.765	14.242735	0.593003	0.6911079	739.2568
9903	15.793380	264.300	311.765	15.793380	0.493796	0.5943559	682.4195
9925	16.457260	264.300	311.765	16.457260	0.428127	0.5295318	619.6603
9951	15.717115	264.300	311.765	15.717115	0.473277	0.5735379	626.9038
9975	15.131305	264.300	311.765	15.131305	0.453730	0.5527239	621.6192
10001	15.323460	264.200	311.765	15.323460	0.532910	0.6330878	690.0860
10028	14.871245	264.100	311.765	14.871245	0.558392	0.6581391	709.5452
10057	17.511240	264.100	311.765	17.511240	0.414236	0.5182550	571.5873
10089	15.605590	264.100	311.765	15.605590	0.595404	0.6968329	755.3575
10120	16.048725	264.000	311.765	16.048725	0.350761	0.4515187	534.7282
10153	16.008700	263.700	311.765	16.008700	0.473838	0.5761718	620.5802
10187	15.144115	263.700	311.765	15.144115	0.481948	0.5826393	625.3639
10222	16.486195	264.550	311.765	16.486195	0.392532	0.4931097	580.0821
10262	17.041910	264.550	311.765	17.041910	0.394061	0.4957894	589.6187
10299	15.637060	265.700	311.765	15.637060	0.427851	0.5242007	629.4315
10337	15.631225	265.300	311.765	15.631225	0.426451	0.5237547	598.1365
10376	15.559980	264.900	311.765	15.559980	0.479709	0.5782357	673.6663
10415	16.365245	266.200	311.765	16.365245	0.414970	0.5113874	587.8941
10458	16.276965	266.200	311.765	16.276965	0.484494	0.5812297	651.0873
10497	16.349345	266.200	311.765	16.349345	0.438019	0.5345677	596.6823
10536	16.278340	267.200	311.765	16.278340	0.464915	0.5590612	644.7443
10612	16.047825	267.200	311.765	16.047825	0.503634	0.5976156	642.6355
10690	16.485350	266.450	311.765	16.485350	0.448163	0.5444287	594.6121
10762	16.975485	266.000	311.765	16.975485	0.435743	0.5340014	628.2285
10835	17.668380	265.550	311.765	17.668380	0.473725	0.5748204	643.6302
10904	15.477845	266.350	311.765	15.477845	0.524962	0.6201108	682.9946
10972	15.780770	266.200	311.765	15.780770	0.567718	0.6640917	705.2192

11044	17.062450	266.200	311.765	17.062450	0.422194	0.5200306	578.2325
11113	14.071460	264.800	311.765	14.071460	0.541849	0.6383245	698.1753
11187	16.074465	265.150	311.765	16.074465	0.490152	0.5891307	683.0402
11258	17.405490	264.400	311.765	17.405490	0.513015	0.6167806	612.0269
11333	15.502385	264.455	311.765	15.502385	0.543125	0.6430926	644.9362
11414	14.840655	266.320	311.765	14.840655	0.487248	0.5810634	621.6754
11499	15.364930	267.415	311.765	15.364930	0.513904	0.6061976	650.4960
11594	14.643270	261.000	311.765	14.643270	0.462316	0.5685334	537.9126
11888	15.016305	253.730	311.765	15.016305	0.445394	0.5708210	588.6725
11954	13.614930	251.455	311.765	13.614930	0.389403	0.5169353	502.4309
12022	14.482675	248.130	311.765	14.482675	0.465376	0.6046052	622.6417
12091	14.124780	253.345	311.765	14.124780	0.417931	0.5420163	534.9949
12234	12.575605	249.090	311.765	12.575605	0.480760	0.6128908	568.9026
12382	12.307820	243.655	311.765	12.307820	0.477946	0.6237987	597.5819
12537	12.471630	248.330	311.765	12.471630	0.474711	0.6085223	593.1488
12698	12.908245	242.915	311.765	12.908245	0.428726	0.5776153	545.9501
12871	13.249050	240.295	311.765	13.249050	0.425493	0.5825388	564.7844
13043	13.682535	236.770	311.765	13.682535	0.483385	0.6525057	623.0165
13218	12.610745	239.410	311.765	12.610745	0.536082	0.6950886	651.1141
13397	13.914370	237.830	311.765	13.914370	0.439547	0.6057651	597.1102
13578	14.723270	239.845	311.765	14.723270	0.458435	0.6215434	604.0049
13762	13.627845	241.110	311.765	13.627845	0.466207	0.6225087	621.0680
13947	15.317390	238.245	311.765	15.317390	0.469603	0.6394711	650.5201
14133	13.802605	237.820	311.765	13.802605	0.450253	0.6162855	645.9615
14327	14.841775	238.940	311.765	14.841775	0.349928	0.5147396	541.9867
14512	13.351390	241.600	311.765	13.351390	0.498382	0.6528890	660.4413
14695	14.525705	233.200	311.765	14.525705	0.418140	0.5998447	634.8851
14877	13.996235	230.035	311.765	13.996235	0.433336	0.6230895	651.3052
15056	15.177935	227.185	311.765	15.177935	0.443005	0.6463909	700.8242
15144	13.245490	229.240	311.765	13.245490	0.489104	0.6794420	711.1176
15231	13.647995	229.225	311.765	13.647995	0.515634	0.7078041	745.1494
15317	12.467560	227.640	311.765	12.467560	0.513872	0.7067997	744.4757
15402	13.452520	225.065	311.765	13.452520	0.492902	0.6971494	752.1644
15486	14.472345	223.400	311.765	14.472345	0.459350	0.6725136	746.7880

15576	16.186575	223.145	311.765	16.186575	0.491031	0.7129707	842.8495
15722	12.524460	223.510	311.765	12.524460	0.429873	0.6346826	581.4200
15793	12.398135	223.610	311.765	12.398135	0.430739	0.6347852	644.5161
15870	10.760215	222.935	311.765	10.760215	0.453890	0.6546814	565.2222
15939	12.350730	223.770	311.765	12.350730	0.365376	0.5677707	605.8421
16006	12.724970	223.400	311.765	12.724970	0.375637	0.5807156	545.1309
16072	13.518925	224.360	311.765	13.518925	0.366020	0.5708724	666.2029
16137	10.445880	223.635	311.765	10.445880	0.441893	0.6393225	611.8684
16206	13.415415	227.320	311.765	13.415415	0.342865	0.5376748	524.2261
16269	11.893750	216.390	311.765	11.893750	0.422392	0.6477957	505.6399
16330	10.199119	213.515	311.765	10.199119	0.474221	0.7034919	638.6570
16391	11.017990	210.360	311.765	11.017990	0.442874	0.6855141	781.8136
16452	11.550620	217.190	311.765	11.550620	0.395824	0.6168177	568.3619
16517	11.802705	208.300	311.765	11.802705	0.278469	0.5286568	523.7683
16576	11.148750	208.555	311.765	11.148750	0.448982	0.6985730	795.6257
16635	12.849935	210.805	311.765	12.849935	0.375400	0.6232079	541.8057
16694	13.012700	211.700	311.765	13.012700	0.341791	0.5865664	685.1012
16753	12.077215	207.890	311.765	12.077215	0.363719	0.6181817	609.3573
16818	14.158905	205.360	311.765	14.158905	0.373298	0.6475311	748.6596
16876	10.790900	204.060	311.765	10.790900	0.451034	0.7151741	675.9249
16935	12.048430	203.625	311.765	12.048430	0.390956	0.6613787	804.3405
16994	10.837725	203.625	311.765	10.837725	0.480079	0.7465846	796.6691
17053	10.031810	203.210	311.765	10.031810	0.465448	0.7295929	714.9853
17118	9.895848	200.365	311.765	9.895848	0.461283	0.7351624	724.8573
17177	10.426055	198.460	311.765	10.426055	0.477632	0.7614697	850.5059
17236	12.864705	198.290	311.765	12.864705	0.380516	0.6754460	593.8172
17295	11.274705	195.265	311.765	11.274705	0.446154	0.7460172	819.7036
17354	12.146745	190.500	311.765	12.146745	0.404584	0.7278907	779.8057
17419	11.463015	191.325	311.765	11.463015	0.396909	0.7126600	649.5240
17478	10.420725	192.240	311.765	10.420725	0.424005	0.7310141	656.1430
17537	12.035565	192.495	311.765	12.035565	0.385468	0.6993494	822.6048
17596	11.631775	196.375	311.765	11.631775	0.438248	0.7354064	792.2104
17655	11.983090	193.795	311.765	11.983090	0.352284	0.6597846	650.3921
17720	11.907815	189.965	311.765	11.907815	0.419211	0.7437236	682.1090

17779	10.722560	189.475	311.765	10.722560	0.441874	0.7622339	681.1381
17838	11.743250	190.365	311.765	11.743250	0.407721	0.7293174	646.1308
17898	12.404180	190.990	311.765	12.404180	0.365678	0.6875144	782.4091
17957	11.455935	188.600	311.765	11.455935	0.376603	0.7032369	622.9404
18023	12.783990	187.790	311.765	12.783990	0.349292	0.6868034	682.6192
18084	13.026125	188.615	311.765	13.026125	0.392178	0.7286793	638.7041
18145	12.796495	186.945	311.765	12.796495	0.328991	0.6697865	638.6599
18207	12.380540	187.265	311.765	12.380540	0.382299	0.7203911	653.0929
18269	10.786970	188.775	311.765	10.786970	0.431274	0.7546654	619.6696
18339	12.451600	187.925	311.765	12.451600	0.363905	0.6991054	653.9091
18402	11.038440	188.340	311.765	11.038440	0.502894	0.8312604	808.6281
18466	12.180700	187.270	311.765	12.180700	0.381802	0.7186187	702.1252
18530	10.514090	187.670	311.765	10.514090	0.435265	0.7618715	737.4925
18666	12.243875	193.900	311.765	12.243875	0.278691	0.5855465	569.2444
18796	11.128360	192.970	311.765	11.128360	0.398897	0.7061352	741.7945
18939	10.852120	190.605	311.765	10.852120	0.461861	0.7787147	729.3711
19087	10.722190	191.900	311.765	10.722190	0.409936	0.7195879	740.4662
19227	10.324510	191.335	311.765	10.324510	0.375349	0.6843980	694.9279
19370	10.942980	191.550	311.765	10.942980	0.472478	0.7861805	734.3767
19504	9.740445	190.235	311.765	9.740445	0.489560	0.8026450	767.3624
19639	10.050925	191.420	311.765	10.050925	0.467545	0.7769276	860.4903
19768	10.674020	193.600	311.765	10.674020	0.472280	0.7762318	826.2905
19886	12.180290	196.060	311.765	12.180290	0.465912	0.7678823	848.8053
20003	10.977170	194.890	311.765	10.977170	0.461431	0.7615692	901.9632
20106	10.556615	192.095	311.765	10.556615	0.427358	0.7357401	765.2277
20206	11.882545	192.095	311.765	11.882545	0.431126	0.7468500	771.4161
20295	9.269087	190.230	311.765	9.269087	0.511353	0.8225450	911.4440
20372	11.081285	190.230	311.765	11.081285	0.420676	0.7393880	713.4912
20448	10.071010	191.960	311.765	10.071010	0.458223	0.7653210	848.3831
20517	10.921845	191.960	311.765	10.921845	0.423512	0.7342995	837.1835
20590	9.857285	190.845	311.765	9.857285	0.489315	0.8005200	909.6953
20666	12.753365	190.845	311.765	12.753365	0.381058	0.7059682	676.8278
20745	9.532400	190.210	311.765	9.532400	0.509561	0.8221341	884.3135
20837	9.162833	191.765	311.765	9.162833	0.491845	0.7959138	807.9485

20940	10.531110	191.765	311.765	10.531110	0.457853	0.7681316	785.7791
21048	9.612870	189.635	311.765	9.612870	0.481180	0.7958570	882.3943
21173	10.006380	189.225	311.765	10.006380	0.491841	0.8105213	947.5783
21301	10.426695	188.645	311.765	10.426695	0.430404	0.7523211	875.6226
21433	8.329884	186.235	311.765	8.329884	0.490850	0.8131384	976.2382
21574	11.400080	186.595	311.765	11.400080	0.417916	0.7538175	705.1035
21716	10.645230	186.595	311.765	10.645230	0.460863	0.7934012	910.2173
21866	8.680892	189.370	311.765	8.680892	0.455234	0.7656732	756.3772
22031	10.720585	189.080	311.765	10.720585	0.430449	0.7521747	893.1390
22197	9.247492	191.270	311.765	9.247492	0.408191	0.7127664	729.3531
22379	9.802635	187.020	311.765	9.802635	0.528548	0.8562043	975.0788
22560	10.650660	184.945	311.765	10.650660	0.425217	0.7640194	831.5441
22748	10.275895	190.010	311.765	10.275895	0.386687	0.7011255	633.5925
22952	11.933450	189.400	311.765	11.933450	0.415948	0.7429313	809.8714
23152	12.001330	189.340	311.765	12.001330	0.425240	0.7531054	874.9174
23368	13.181340	190.155	311.765	13.181340	0.371450	0.7017279	786.2470
23577	13.330280	187.385	311.765	13.330280	0.317124	0.6591367	785.7516
23788	12.119755	185.560	311.765	12.119755	0.377940	0.7217877	765.4494
24012	13.303990	183.905	311.765	13.303990	0.263031	0.6191416	707.0564
24226	13.457145	185.705	311.765	13.457145	0.315264	0.6655987	699.8261
24450	13.995055	183.650	311.765	13.995055	0.321666	0.6853731	644.1632
24662	13.712425	180.570	311.765	13.712425	0.299384	0.6749862	732.5344
24871	12.357000	180.630	311.765	12.357000	0.344610	0.7115335	973.3520
25088	9.163590	180.690	311.765	9.163590	0.477244	0.8273903	787.1567
25291	11.272245	181.675	311.765	11.272245	0.449034	0.8067728	877.0789
25501	11.086455	183.020	311.765	11.086455	0.440271	0.7905541	851.7646
25699	11.214125	184.960	311.765	11.214125	0.495095	0.8389456	1017.4711
25896	11.459530	185.530	311.765	11.459530	0.381754	0.7217457	879.2501
26104	11.427615	184.545	311.765	11.427615	0.426935	0.7722025	945.4518
26412	11.348065	184.890	311.765	11.348065	0.429776	0.7731046	884.3746
26614	11.676505	185.475	311.765	11.676505	0.405258	0.7474084	809.3835
26829	12.480595	185.935	311.765	12.480595	0.451586	0.7979315	904.0336
27049	11.751265	186.830	311.765	11.751265	0.415035	0.7519608	876.7413
27274	11.103970	192.495	311.765	11.103970	0.404285	0.7134391	694.1599

27506	12.480025	191.380	311.765	12.480025	0.396843	0.7182230	706.3160
27733	12.317240	189.300	311.765	12.317240	0.400278	0.7296078	627.5629
27974	12.569895	189.290	311.765	12.569895	0.371344	0.7015541	617.3493
28219	10.972120	191.705	311.765	10.972120	0.375762	0.6867650	636.2777
28821	11.616680	193.890	311.765	11.616680	0.368870	0.6743491	620.7185
29398	11.096930	189.520	311.765	11.096930	0.524119	0.8483287	857.7569
30419	10.134460	184.300	311.765	10.134460	0.448462	0.7876462	885.9953
31388	11.638685	189.215	311.765	11.638685	0.379583	0.7047480	692.5351
32106	10.132605	195.165	311.765	10.132605	0.484969	0.7802595	771.1049
32889	9.834265	196.700	311.765	9.834265	0.548047	0.8372809	806.3470
33545	10.880855	197.465	311.765	10.880855	0.429742	0.7186084	775.4343
34631	10.377045	199.590	311.765	10.377045	0.458898	0.7378363	881.9104
35945	10.751385	201.045	311.765	10.751385	0.492588	0.7685044	878.4909
36937	9.278780	203.510	311.765	9.278780	0.514820	0.7756231	752.4261
38485	9.198735	208.655	311.765	9.198735	0.498090	0.7403023	781.9657
39103	8.392639	205.800	311.765	8.392639	0.546192	0.7959731	813.5366
39681	11.449825	196.185	311.765	11.449825	0.427039	0.7237503	687.2085
40002	13.257680	195.075	311.765	13.257680	0.314463	0.6231371	667.9825
40253	9.932895	195.795	311.765	9.932895	0.546388	0.8395661	977.6904
40657	8.272382	200.975	311.765	8.272382	0.500606	0.7660602	790.6316
41029	10.137130	201.250	311.765	10.137130	0.433944	0.7050933	744.8257
41327	9.530069	204.190	311.765	9.530069	0.458241	0.7165894	686.4115
41758	10.671990	201.120	311.765	10.671990	0.441728	0.7159655	692.9627
42029	11.580640	199.890	311.765	11.580640	0.409008	0.6915956	644.0793
42240	8.755353	200.395	311.765	8.755353	0.467121	0.7360225	773.9770
42495	10.413640	202.865	311.765	10.413640	0.495868	0.7635531	790.8188
42877	10.613855	205.305	311.765	10.613855	0.381419	0.6389533	655.5696
43740	11.207270	202.435	311.765	11.207270	0.507078	0.7802325	875.7109
44062	11.711450	204.310	311.765	11.711450	0.391607	0.6579016	601.9406
44404	11.324645	205.525	311.765	11.324645	0.471039	0.7326490	795.9192
44764	11.184635	211.365	311.765	11.184635	0.411543	0.6508587	629.3818
45138	13.376115	209.720	311.765	13.376115	0.323035	0.5761925	522.6178
45525	12.733005	216.005	311.765	12.733005	0.359366	0.5884075	531.3295
46322	12.018120	218.350	311.765	12.018120	0.347459	0.5656716	516.0201

47601	10.271700	204.025	311.765	10.271700	0.407037	0.6681573	645.6882
48772	10.887380	201.280	311.765	10.887380	0.429229	0.7036251	715.0754
50937	11.221780	207.525	311.765	11.221780	0.548830	0.8042388	822.6951
52168	12.206855	216.450	311.765	12.206855	0.385159	0.6109921	605.6540
52330	10.884445	216.450	311.765	10.884445	0.488210	0.7106113	690.6223
52933	10.531495	222.435	311.765	10.531495	0.539465	0.7423055	783.8925
53562	12.023970	222.200	311.765	12.023970	0.590746	0.8003341	860.0625
54360	10.969175	219.165	311.765	10.969175	0.556933	0.7719190	858.0087
56695	11.799285	212.440	311.765	11.799285	0.508502	0.7483771	726.0686
56821	9.676870	214.070	311.765	9.676870	0.529626	0.7560543	719.1671
58294	13.096980	223.750	311.765	13.096980	0.434754	0.6409971	609.8123
59004	12.654425	231.290	311.765	12.654425	0.412567	0.5936780	608.2146
61201	11.728895	209.260	311.765	11.728895	0.554980	0.8065404	902.6733
61618	10.919690	208.640	311.765	10.919690	0.486621	0.7356262	822.3662
63345	10.277420	198.775	311.765	10.277420	0.590586	0.8748583	1035.1422
65500	12.364315	208.980	311.765	12.364315	0.548204	0.8035031	870.4080
65984	13.201235	200.590	311.765	13.201235	0.349848	0.6368910	714.0611
67492	10.500190	202.450	311.765	10.500190	0.461421	0.7303409	769.1561
69280	11.543625	208.340	311.765	11.543625	0.466809	0.7192034	814.0338
69681	8.818884	213.405	311.765	8.818884	0.550936	0.7768226	805.5063
70083	12.575910	217.940	311.765	12.575910	0.331883	0.5533706	683.8588
71728	12.949905	238.510	311.765	12.949905	0.493640	0.6556646	732.0707
73834	12.521990	232.035	311.765	12.521990	0.527963	0.7079547	851.5469
74427	12.942090	236.285	311.765	12.942090	0.470405	0.6385041	755.8199
75975	11.813955	244.640	311.765	11.813955	0.429378	0.5708658	671.7523
78001	16.088725	225.785	311.765	16.088725	0.430684	0.6422849	770.0770
78428	14.814645	225.395	311.765	14.814645	0.523328	0.7322967	804.9222
80167	13.590870	232.670	311.765	13.590870	0.374170	0.5537187	590.0211
82264	9.319097	239.880	311.765	9.319097	0.456190	0.6046325	533.2016
85406	10.705515	234.690	311.765	10.705515	0.407783	0.5732341	553.6733
86807	10.347030	222.220	311.765	10.347030	0.383166	0.5837411	510.9133
89490	11.854085	228.130	311.765	11.854085	0.448199	0.6366665	534.5112
91816	10.817200	232.430	311.765	10.817200	0.548471	0.7224035	724.6307
93907	12.882770	238.210	311.765	12.882770	0.379700	0.5410311	478.2219

96656	12.281340	244.055	311.765	12.281340	0.353974	0.4973712	433.4726
99188	9.735085	243.085	311.765	9.735085	0.430647	0.5713991	609.0522
101967	10.836270	242.415	311.765	10.836270	0.580318	0.7269533	751.4495
102747	11.904570	237.070	311.765	11.904570	0.361761	0.5233083	522.1077
104861	14.935930	240.620	311.765	14.935930	0.484685	0.6465157	698.3533
107565	12.305630	238.385	311.765	12.305630	0.581557	0.7431285	805.4021
110928	13.266150	252.310	311.765	13.266150	0.451387	0.5764928	631.9266
114230	11.368895	264.240	311.765	11.368895	0.526497	0.6197166	648.2637
115535	12.103225	275.060	311.765	12.103225	0.650182	0.7210246	817.0039
117705	15.665745	274.980	311.765	15.665745	0.467457	0.5421980	647.0740
118737	12.090160	272.730	311.765	12.090160	0.591169	0.6667689	743.1254
119619	13.376815	271.165	311.765	13.376815	0.575280	0.6560236	740.3494
121968	14.092390	277.430	311.765	14.092390	0.481000	0.5482382	623.2500
124468	12.453005	278.530	311.765	12.453005	0.494356	0.5574137	626.5081
126463	12.412600	274.085	311.765	12.412600	0.546565	0.6193663	694.4769
129122	13.892880	268.440	311.765	13.892880	0.489728	0.5769765	650.1188
130648	11.791140	251.340	311.765	11.791140	0.615587	0.7414475	808.2792
131332	10.680325	241.130	311.765	10.680325	0.575380	0.7250306	753.8677
132984	10.841310	224.630	311.765	10.841310	0.569515	0.7670355	776.9010
134767	12.392455	212.430	311.765	12.392455	0.554306	0.7975633	813.7706
137439	11.926565	201.460	311.765	11.926565	0.407824	0.6861275	676.8962
138097	11.480050	198.865	311.765	11.480050	0.479383	0.7668837	758.8098
141499	10.685910	194.630	311.765	10.685910	0.462746	0.7624426	717.0367
144323	11.442350	195.305	311.765	11.442350	0.499911	0.8016852	792.3952
144967	12.916365	194.805	311.765	12.916365	0.467325	0.7786019	791.5007
148580	10.440630	198.795	311.765	10.440630	0.536004	0.8198473	789.7381
151686	12.964835	202.350	311.765	12.964835	0.347492	0.6264346	574.7485
153838	11.242885	197.540	311.765	11.242885	0.525301	0.8177331	808.0349
154746	10.348605	197.540	311.765	10.348605	0.466467	0.7532164	763.8171
155018	10.313355	196.300	311.765	10.313355	0.530626	0.8233603	885.7594
156122	12.884660	192.840	311.765	12.884660	0.366830	0.6837765	746.8100
157554	13.089500	189.190	311.765	13.089500	0.471197	0.8075301	897.5981
158915	13.276425	187.250	311.765	13.276425	0.467446	0.8135026	869.4450
160619	7.985918	187.500	311.765	7.985918	0.610210	0.9283861	854.9000

161695	12.010360	187.500	311.765	12.010360	0.446639	0.7830107	818.1905
162919	11.019520	204.300	311.765	11.019520	0.467616	0.7322357	872.7337
163882	11.145145	200.400	311.765	11.145145	0.443579	0.7228031	728.3173
164970	9.264389	196.500	311.765	9.264389	0.482802	0.7687527	764.3931
165836	12.244175	191.600	311.765	12.244175	0.440028	0.7601104	782.2179
167203	9.721515	188.400	311.765	9.721515	0.528851	0.8502994	885.4063
168643	12.880855	185.250	311.765	12.880855	0.491368	0.8444376	900.5291
169889	12.119125	196.600	311.765	12.119125	0.464273	0.7637069	807.9561
171139	10.251235	197.200	311.765	10.251235	0.532404	0.8213826	836.2319
171398	9.795615	197.200	311.765	9.795615	0.505406	0.7916396	797.9833
172514	11.878105	197.750	311.765	11.878105	0.582990	0.8791270	998.4264
172930	9.116090	197.750	311.765	9.116090	0.597110	0.8800248	918.5737
174149	9.733125	197.700	311.765	9.733125	0.466567	0.7497935	823.1310
175288	11.109840	196.850	311.765	11.109840	0.497959	0.7918321	862.4446
175565	11.614275	196.850	311.765	11.614275	0.536219	0.8335311	887.4631
176896	10.283620	189.850	311.765	10.283620	0.549047	0.8679636	956.9025
177960	12.862945	190.100	311.765	12.862945	0.511227	0.8431407	937.4563
179446	12.538305	198.900	311.765	12.538305	0.460554	0.7530244	742.8447
179707	12.398400	207.700	311.765	12.398400	0.356645	0.6131292	586.1470
181254	12.878315	213.200	311.765	12.878315	0.378381	0.6179701	636.1769
181849	12.580135	215.450	311.765	12.580135	0.397286	0.6282100	711.8061
182354	10.924135	207.900	311.765	10.924135	0.337109	0.5859830	505.1887
183523	10.255550	198.900	311.765	10.255550	0.364258	0.6432735	688.0200
184818	7.416540	199.700	311.765	7.416540	0.499713	0.7662723	734.3832
186603	11.920440	207.050	311.765	11.920440	0.368120	0.6249659	633.3968
189340	10.674150	221.000	311.765	10.674150	0.464490	0.6711718	638.9447
190307	8.493256	231.350	311.765	8.493256	0.506649	0.6767842	817.8800
191709	10.294565	225.850	311.765	10.294565	0.442095	0.6323565	718.3671
192795	10.022120	219.150	311.765	10.022120	0.479334	0.6898251	682.2078
194581	10.191110	226.500	311.765	10.191110	0.496187	0.6849425	683.3867
194846	11.431140	226.500	311.765	11.431140	0.441957	0.6338857	650.0428
195710	11.487825	223.250	311.765	11.487825	0.478354	0.6810104	699.4353