|         |          |        | retreating Experiments starting from an initial glacier surface, with regularisation parameters $\lambda_0=1$ and $\lambda_1=100$ |
|---------|----------|--------|---|
|         | . I      | _ 1-   | fg: first guess —— RMSE of $b$ and $b_t$  |
| bed     | shape    | shown  | —— and A: at once approach ——— RMSE of $s_m^e$ and $s_o^e$  |
|         |          |        | —— and B: calculated approach $\cdots$ RMSE of $Ps$ and $Ps_t$  |
|         |          |        | <pre> and C: separated approach</pre>   |
|         |          |        |   |
|         |          |        | DIFF_b, DIFF_s, fct, $T_{cpu}$ 47   |
|         |          |        | fg: 46.5 <mark>9</mark> , 20.01   |
| cliff   | wide top | bed_h  | A: 19.29, 2.67, 15, 125s 0 =  |
|         |          |        | B: 46.14, 24.85, 25, 213s   |
|         |          |        | C: 33.19, 4.11, 33, 251s -47  |
|         |          |        | 0 100 200   |
|         |          |        | DIFF_Ps, DIFF_w, fct, $T_{cpu}$ 1.2   |
|         |          |        | fg: 1.21, 8.30  |
|         |          | Ps     | A: 1.22, 4.48, 15, 125s 0   |
|         |          |        | B: 23.06, 3.04, 25, 213s 1  |
|         |          |        | C: 1.20, 4.66, 33, 251s -1.2  |
|         |          |        | DIEE b DIEE c fot $T$ 30 $\sim$ $\sim$ $\sim$   |
|         |          |        | DIFF_b, DIFF_s, fct, $T_{cpu}$ 38  fg: 37.45, 21.01   |
| random  | constant | bed h  | fg: 37.45, 21.01 10 10 10 10 10 10 10 10 10 10 10 10 1  |
| i andom | Constant | bed_II | B: 26.58, 2.10, 16, 58s   |
|         |          |        | C: 26.68, 4.05, 19, 63s -38   |
|         |          |        | 0 20 40 60  |
|         |          |        | DIFF_Ps, DIFF_w, fct, $T_{cpu}$ 1.5   |
|         |          |        | fg: 1.46, 8.03  |
|         |          | Ps     | A: 1.42, 4.90, 14, 51s 0  |
|         |          |        | B: 1.33, 0.30, 16, 58s  |
|         |          |        | C: 1.47, 5.14, 19, 63s -1.5 0.2   |
|         |          |        | 0 20 40 60  |
|         |          |        | DIFF_b, DIFF_s, fct, $T_{cpu}$ 46   |
|         |          |        | fg: 45.80, 22.35  |
| random  | wide top | bed_h  | A: $25.89$ , $4.39$ , $16$ , $69s \mid 0 \in$   |
|         |          |        | B: 45.75, 20.00, 28, 121s   |
|         |          |        | C: 27.12, 3.18, 30, 119s -46  |
|         |          |        | DIEF DO DIEF W for $T$ 100  |
|         |          |        | DIFF_Ps, DIFF_w, fct, $T_{cpu}$ 1.0   |
|         |          | Ps     | fg: 0.95, 7.53<br>A: 0.96, 4.23, 16, 69s 0  |
|         |          | ı S    | A: 0.96, 4.23, 16, 69s 0<br>B: 15.37, 2.68, 28, 121s  |
|         |          |        | $( \cdot 121 357 30 119s - 10 $   |
|         |          |        | 0 50 100  |
|         |          |        | $T_{cpu}$   |