

Figure 1: Schematic visualization of an iterative merging of three blocks. W_k^i indicate the weights of the block k at a step i . The initial weights of the blocks can be derived from the range of the input covered by the block. Indices $k - l$ indicate a merging of block k to block l . The elements covered in green represent the detail coefficients contained in the blocks. We avoid loading all blocks simultaneously into memory by only merging two blocks at a time.

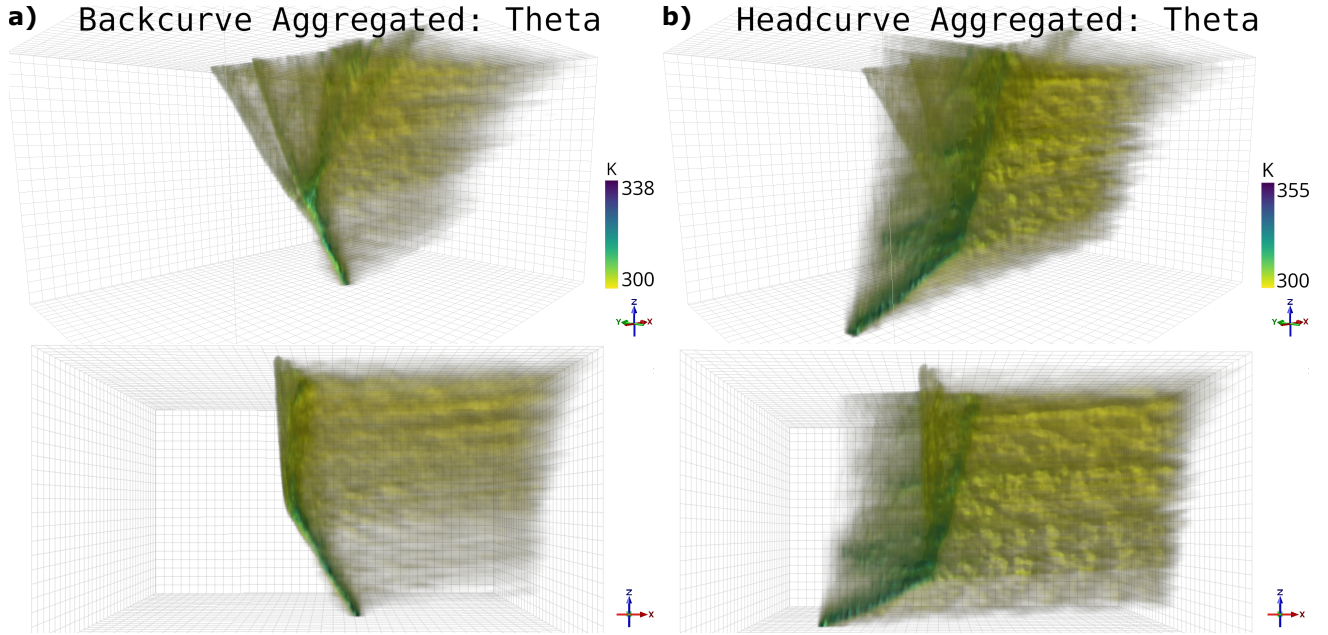


Figure 2: Front and side volume renderings of the aggregated Backcurve (a) and Headcurve (b) runs from the SciVis Contest 2022 ensemble dataset for the time 5s – 690s. The ensemble is reconstructed on the xy-plane on the mountain surface, the time was mapped to the z-axis. The aggregated temperature at each voxel is color-coded in the range of 300K to 338/355K, showing the movement of the fire over time.

Table 1: Comparison of the required disk size for our MMA approach. SV refers to the SciVis Contest dataset and MPI – GE to the Grand Ensemble. The compressed inputs and outputs were compressed with a zstd compression at level 0.

Data	Block size	Input	Output	O/I Ratio	Input (Comp)	Output (Comp)	O/I Ratio (Comp)
d_1	32^2	1001 MiB	1.02 GiB	1.043	891 MiB	994.89 MiB	1.117
d_1	64^2	1001 MiB	1013 MiB	1.011	891 MiB	936.20 MiB	1.051
d_1	128^2	1001 MiB	1004 MiB	1.002	891 MiB	913.86 MiB	1.026
d_2	2^5	4.00 MiB	6.25 MiB	1.563	2.08 MiB	5.30 MiB	2.548
d_2	4^5	4.00 MiB	4.24 MiB	1.060	2.08 MiB	2.52 MiB	1.212
d_2	$8^4 \times 4$	4.00 MiB	4.65 MiB	1.163	2.08 MiB	2.24 MiB	1.077
d_3	4^5	72.56 MiB	93.79 MiB	1.293	37.83 MiB	52.71 MiB	1.393
d_3	$8^4 \times 4$	72.56 MiB	75.74 MiB	1.044	37.83 MiB	41.06 MiB	1.085
d_3	$16^4 \times 4$	72.56 MiB	75.12 MiB	1.035	37.83 MiB	40.36 MiB	1.067
SV	$64^3 \times 8^2$	246.42 GiB	246.43 GiB	1.00004	129.08 GiB	104.77 GiB	0.812
MPI – GE	$128 \times 64^2 \times 16$	12.85 GiB	12.85 GiB	1.0	10.71 GiB	10.24 GiB	0.956

Table 2: Comparison of the required disk size for the FWT approach. SV refers to the SciVis Contest dataset and MPI – GE to the Grand Ensemble. The compressed inputs and outputs were compressed with a zstd compression at level 0.

Data	Block size	Input	Output	O/I Ratio	Input (Comp)	Output (Comp)	O/I Ratio (Comp)
d_1	32^2	1001 MiB	1.02 GiB	1.043	891 MiB	994.78 MiB	1.116
d_1	64^2	1001 MiB	1018.40 MiB	1.011	891 MiB	936.20 MiB	1.051
d_1	128^2	1001 MiB	1018.63 MiB	1.002	891 MiB	913.93 MiB	1.026
d_2	2^5	4.00 MiB	6.25 MiB	1.563	2.08 MiB	5.30 MiB	2.548
d_2	4^5	4.00 MiB	4.24 MiB	1.060	2.08 MiB	2.52 MiB	1.212
d_2	$8^4 \times 4$	4.00 MiB	4.65 MiB	1.163	2.08 MiB	2.24 MiB	1.077
d_3	4^5	72.56 MiB	150.11 MiB	1.293	37.83 MiB	50.06 MiB	1.323
d_3	$8^4 \times 4$	72.56 MiB	158.44 MiB	1.044	37.83 MiB	40.98 MiB	1.083
d_3	$16^4 \times 4$	72.56 MiB	290.20 MiB	1.035	37.83 MiB	40.88 MiB	1.08
MPI – GE	$128 \times 64^2 \times 16$	26.26 GiB	12.85 GiB	1.0	10.71 GiB	10.52 GiB	0.982