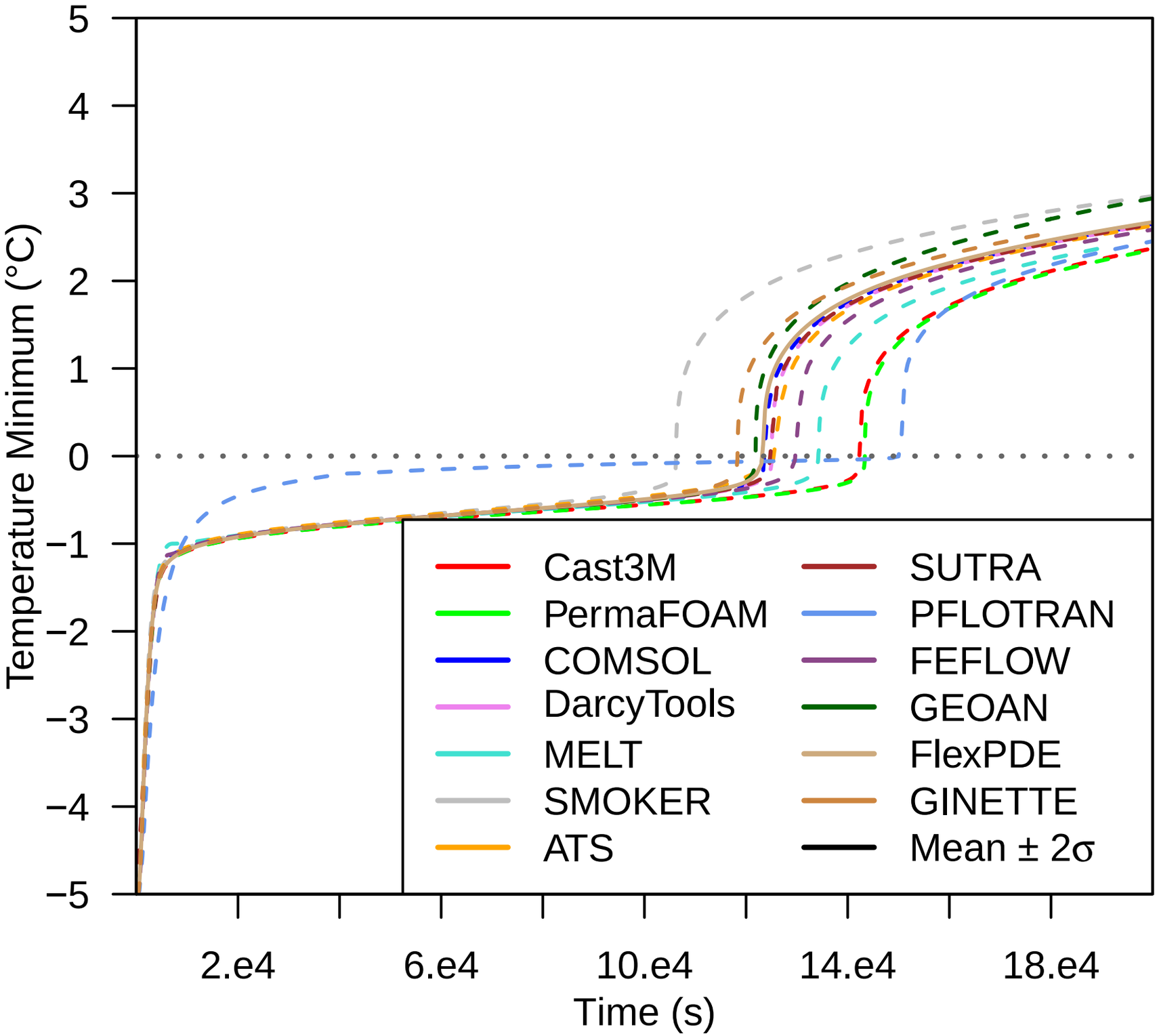
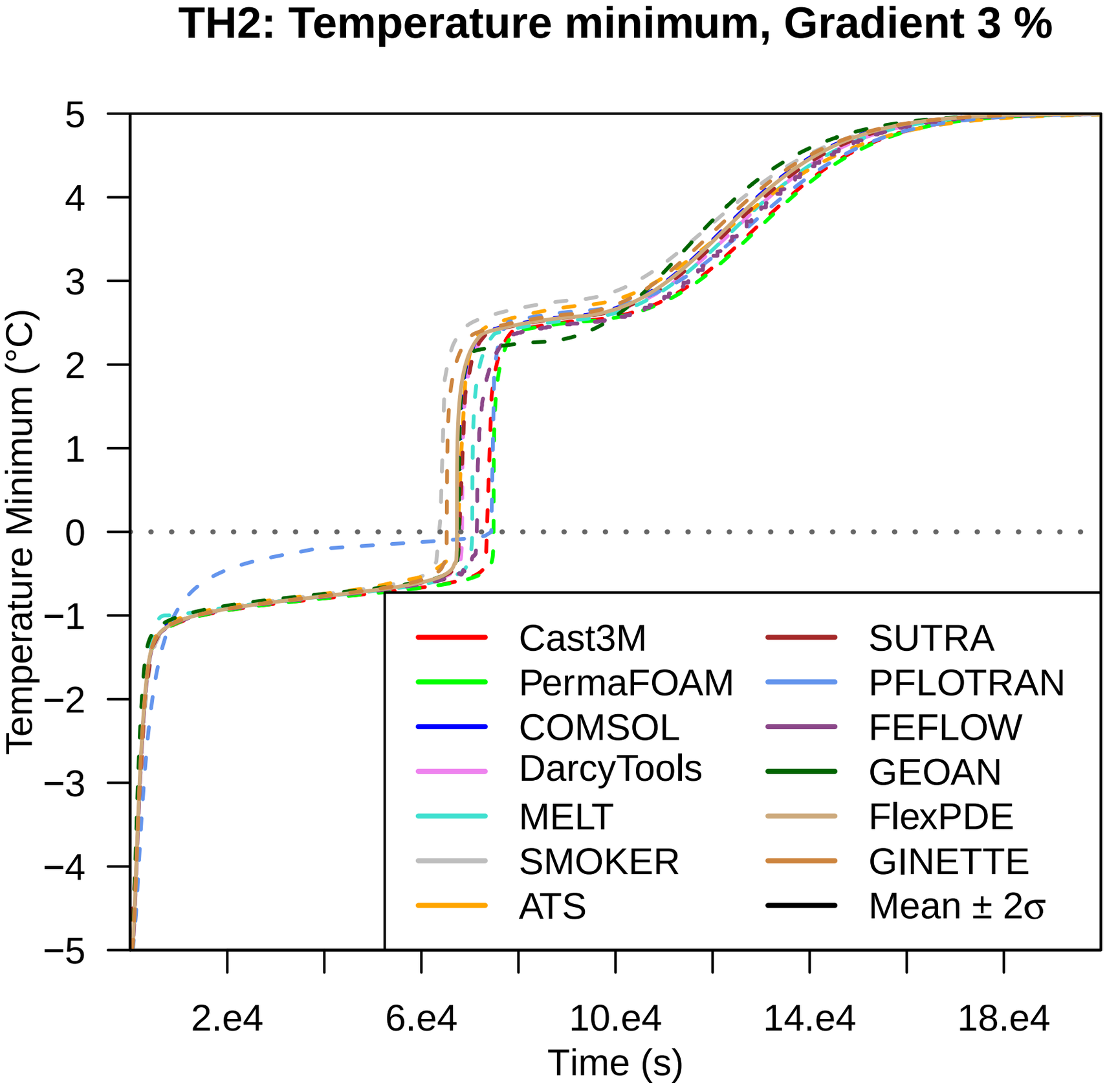
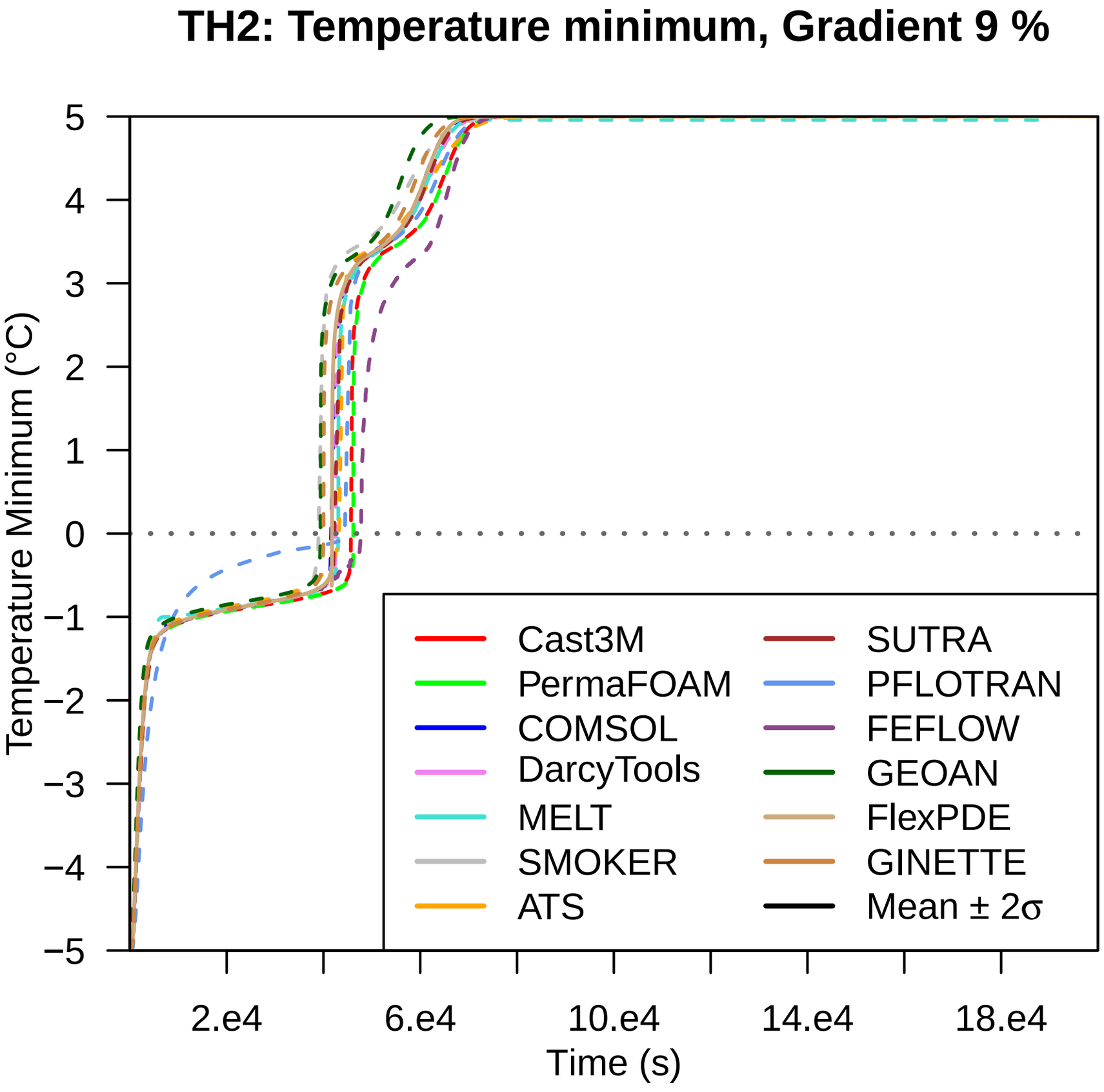
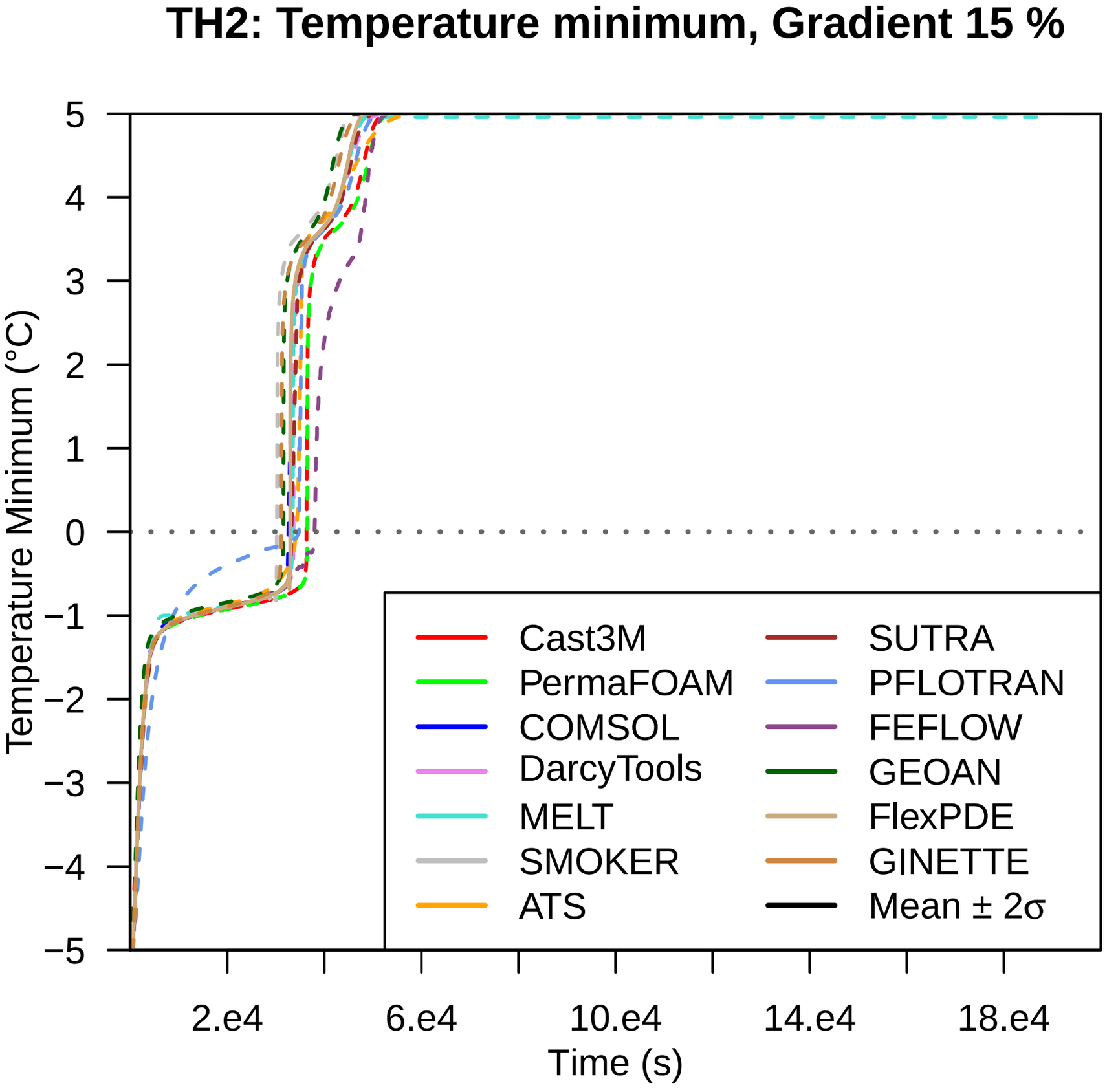
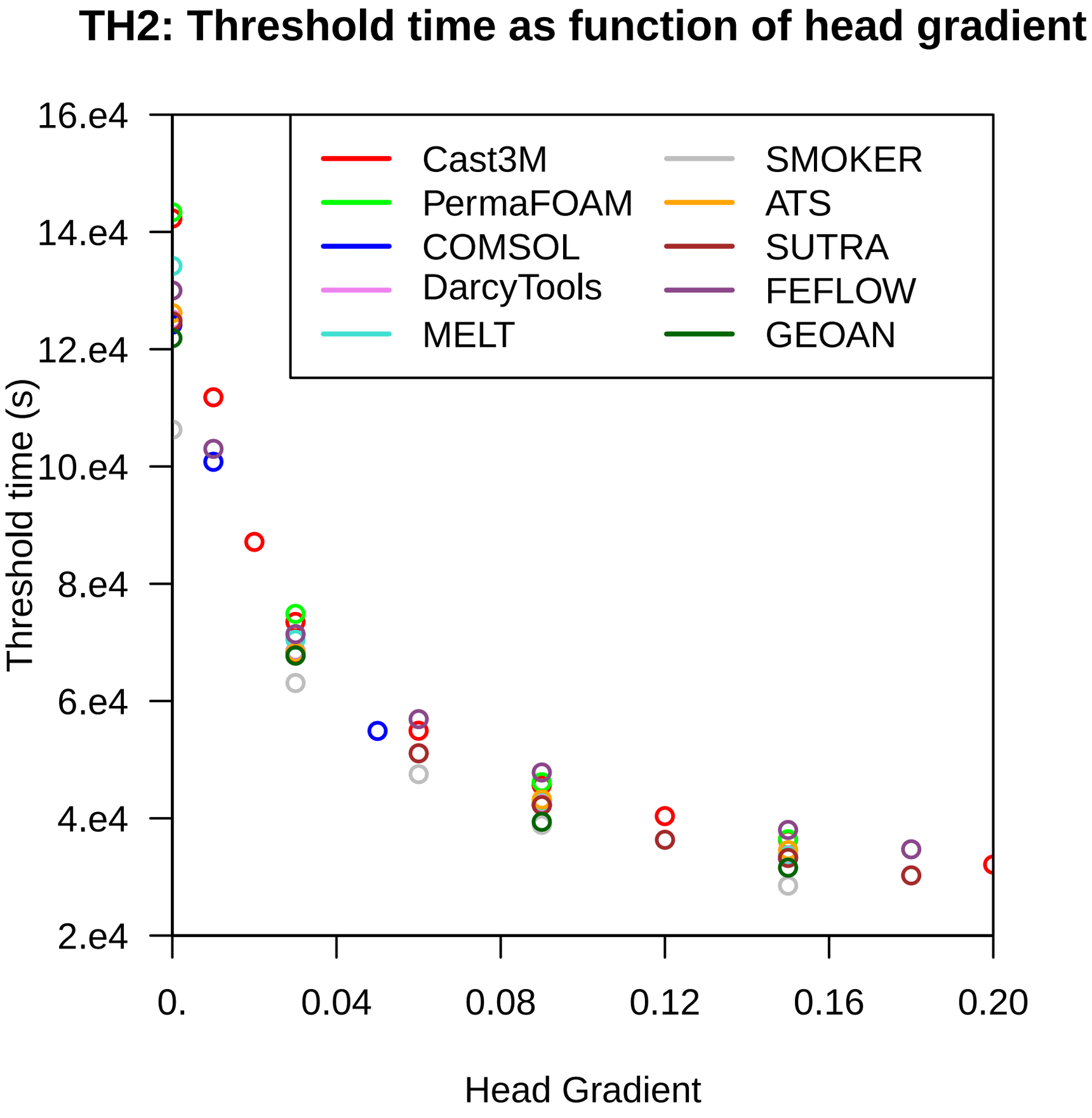
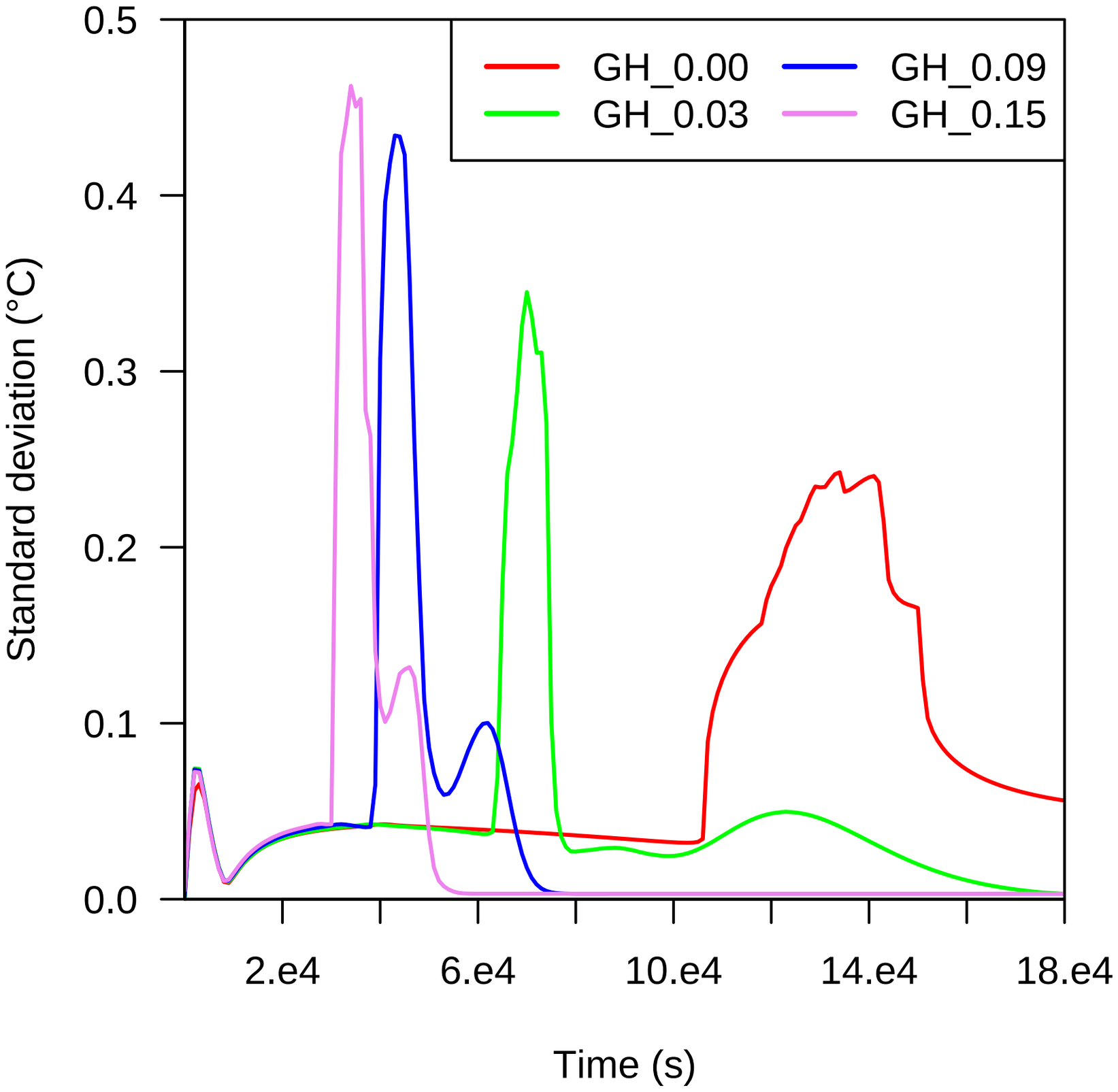

TH2: Temperature minimum, Gradient 0 %
Temperature Minimum (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

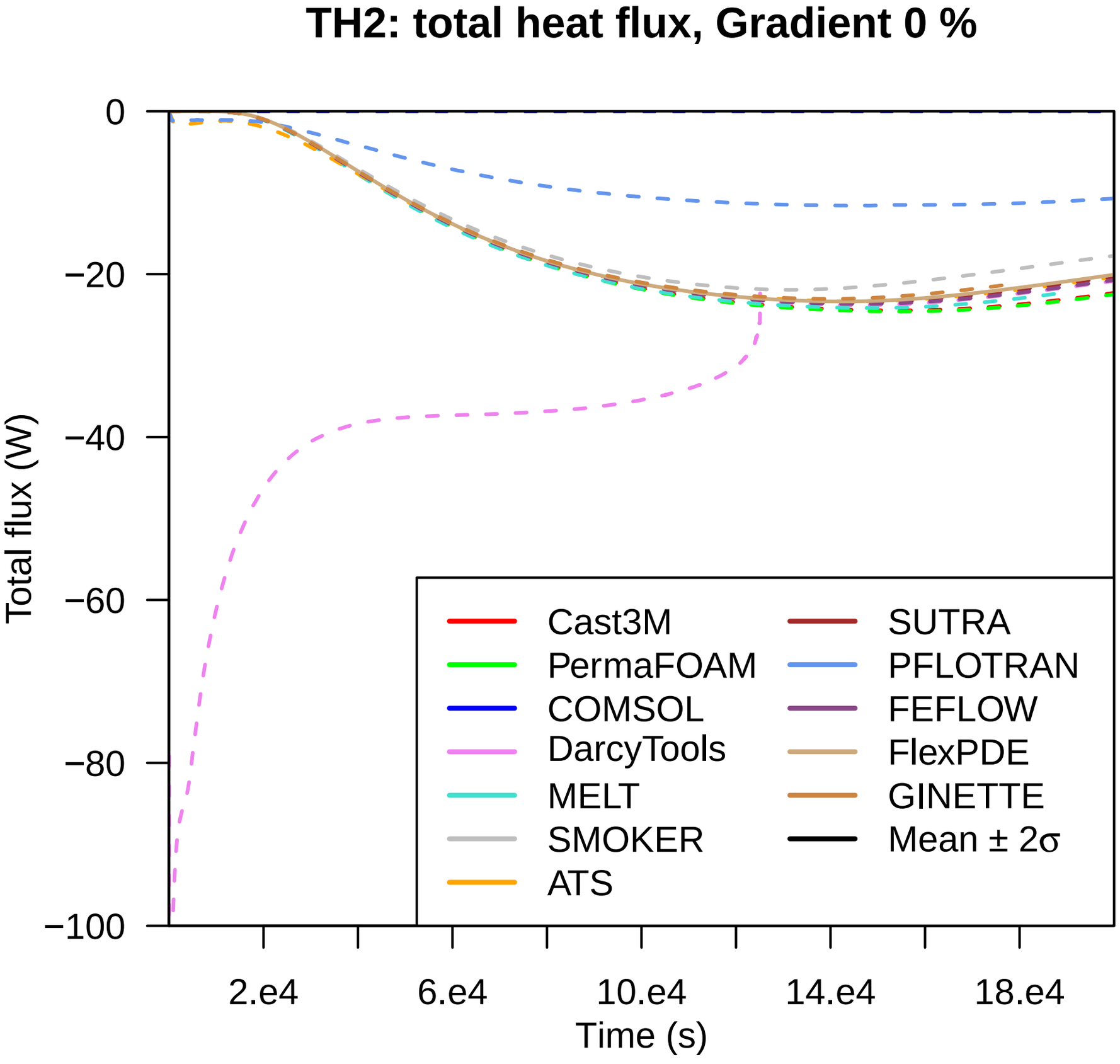

TH2: Temperature minimum, Gradient 3 %
Temperature Minimum (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

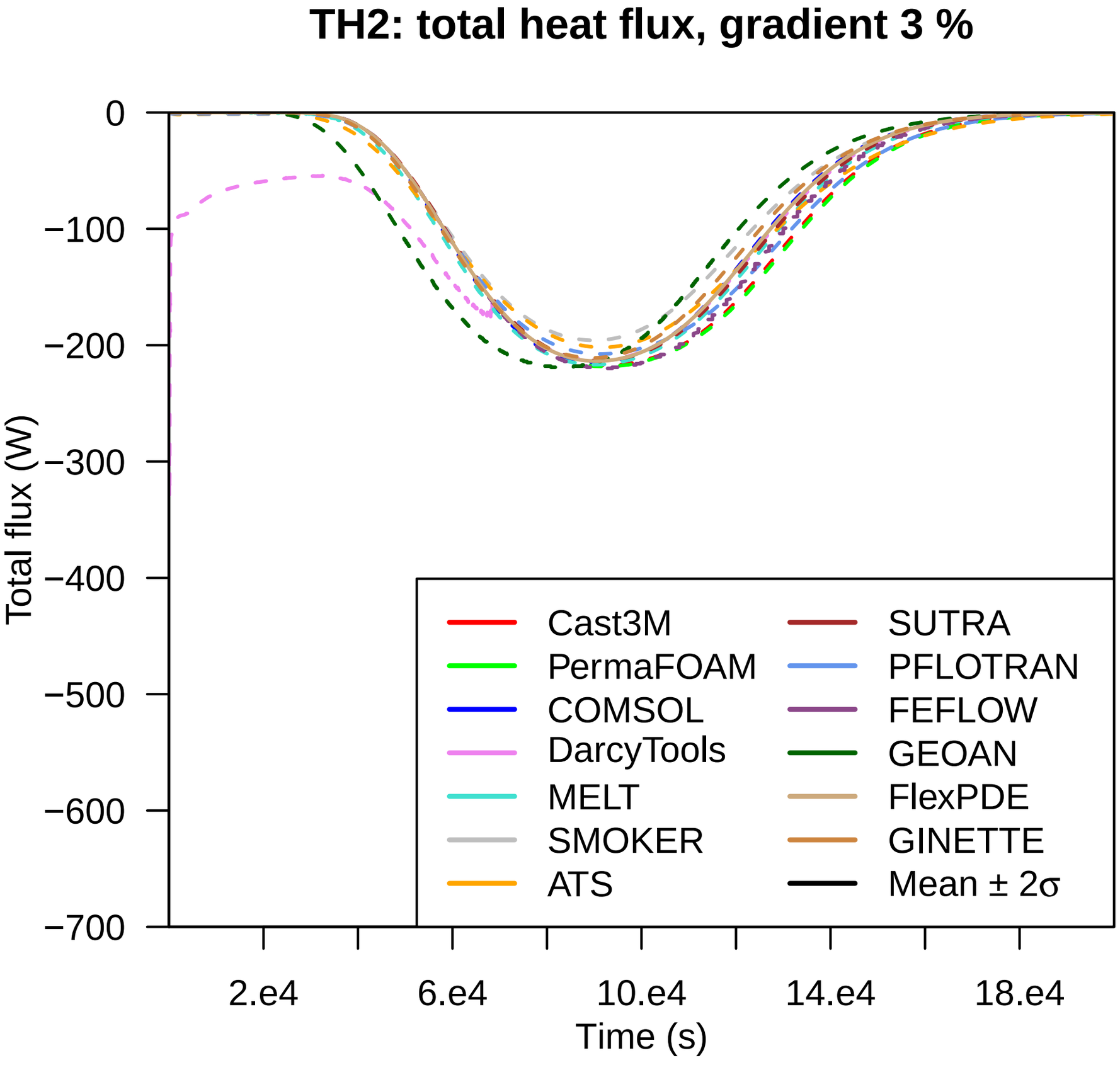

TH2: Temperature minimum, Gradient 9 %
Temperature Minimum (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

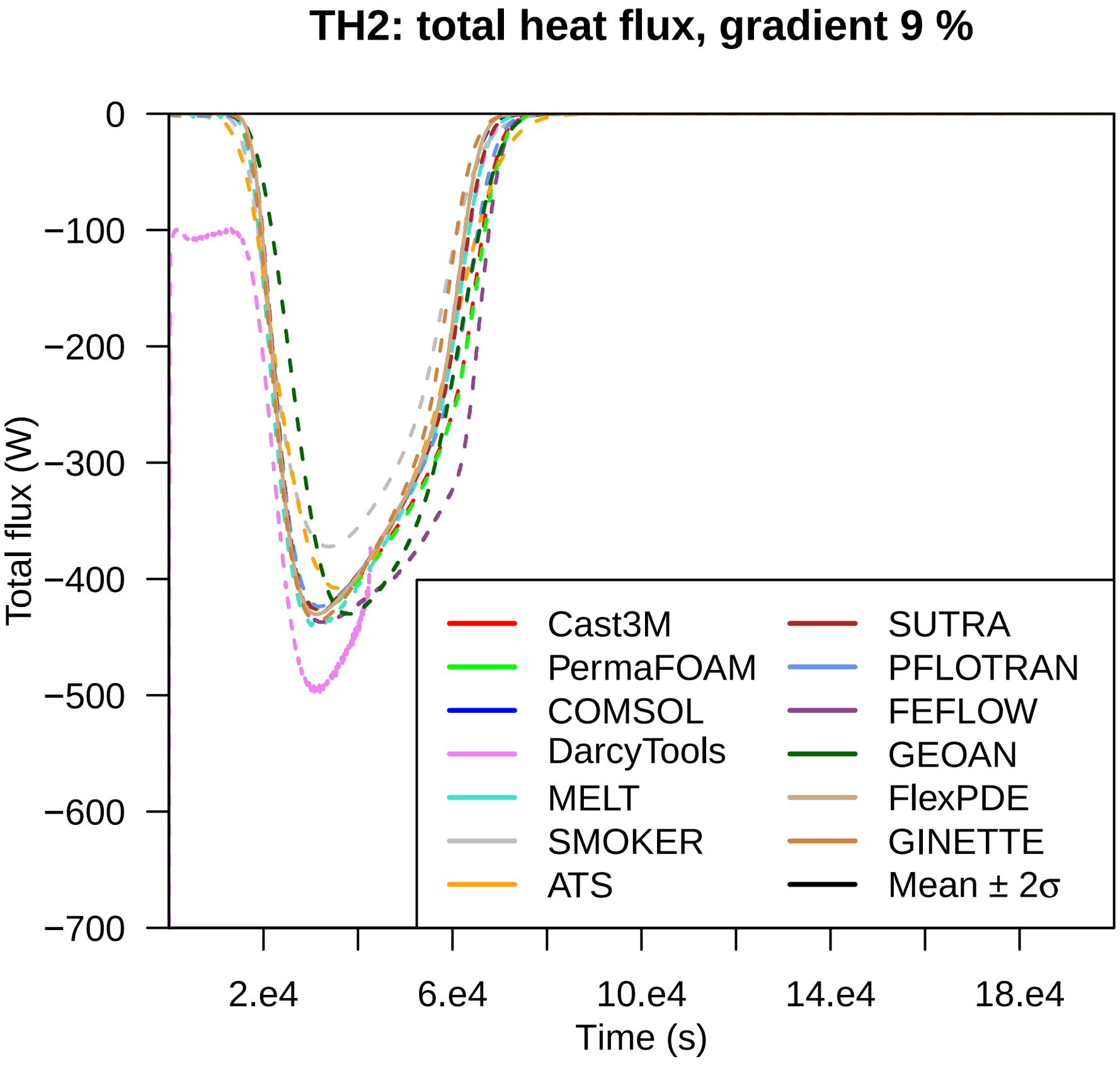

TH2: Temperature minimum, Gradient 15 %
Temperature Minimum (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

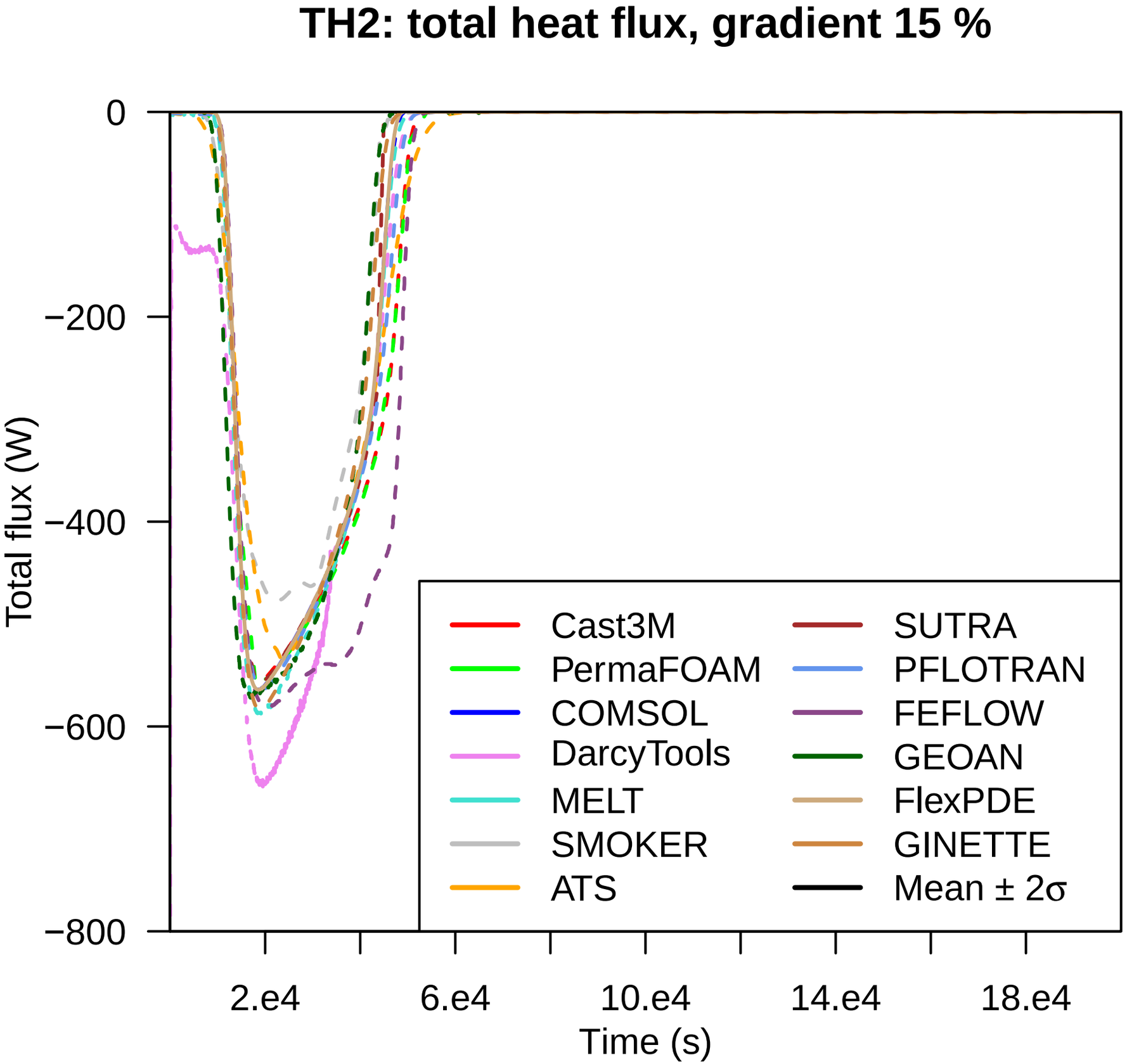

TH2: Threshold time as function of head gradient
16.e4
14.e4
12.e4
10.e4
8.e4
6.e4
4.e4
2.e4
Threshold time (s)
0.
0.04
0.08
0.12
0.16
0.20
Head Gradient
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
FEFLOW
GEOAN

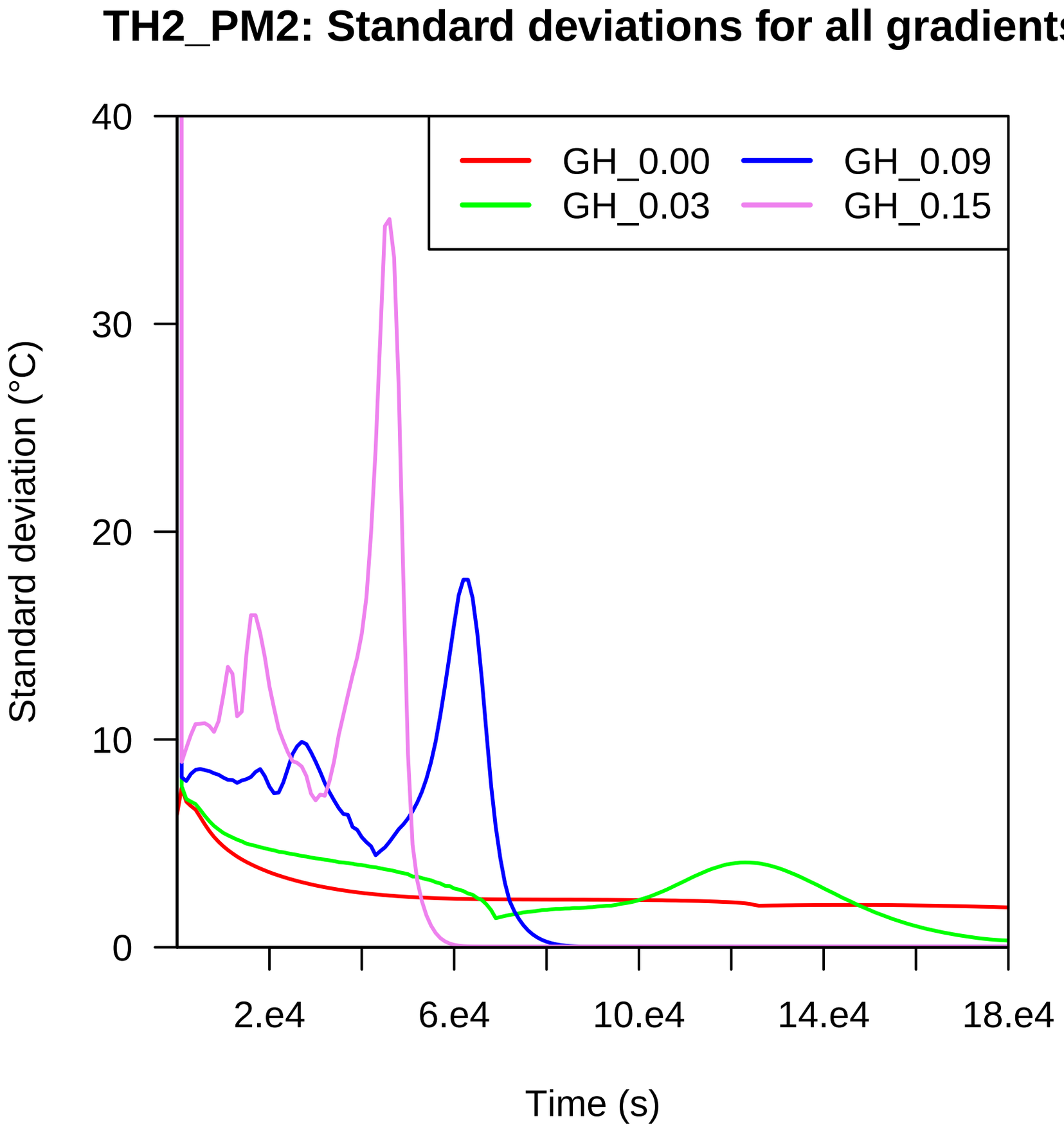

TH2_PM1: Standard deviations for all gradients
GH_0.00
GH_0.09
GH_0.03
GH_0.15
Standard deviation (°C)
0.0
0.1
0.2
0.3
0.4
0.5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)

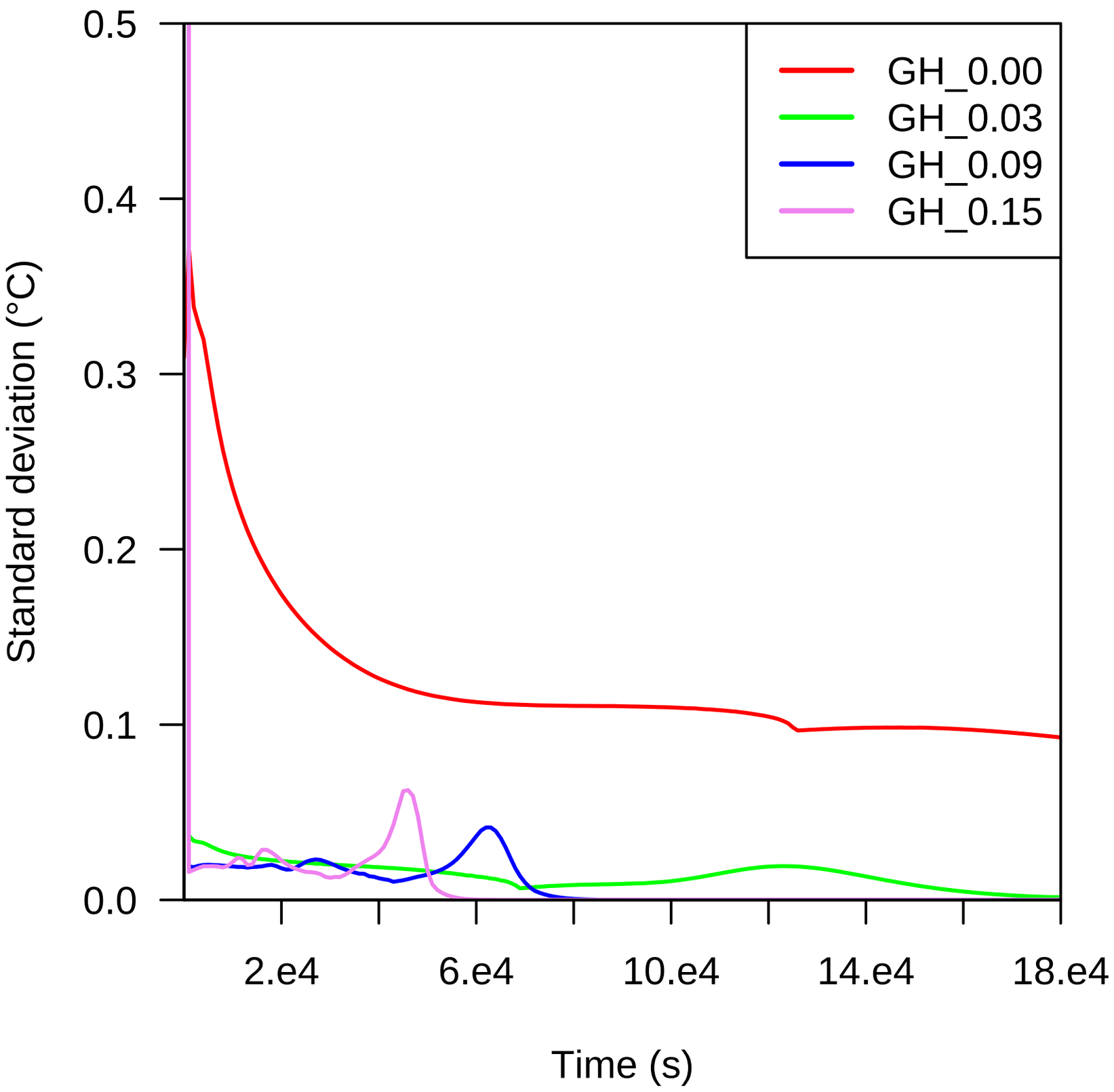

TH2: total heat flux, Gradient 0 %
0
−20
−40
−60
−80
−100
Total flux (W)
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
FlexPDE
GINETTE
Mean ± 2σ

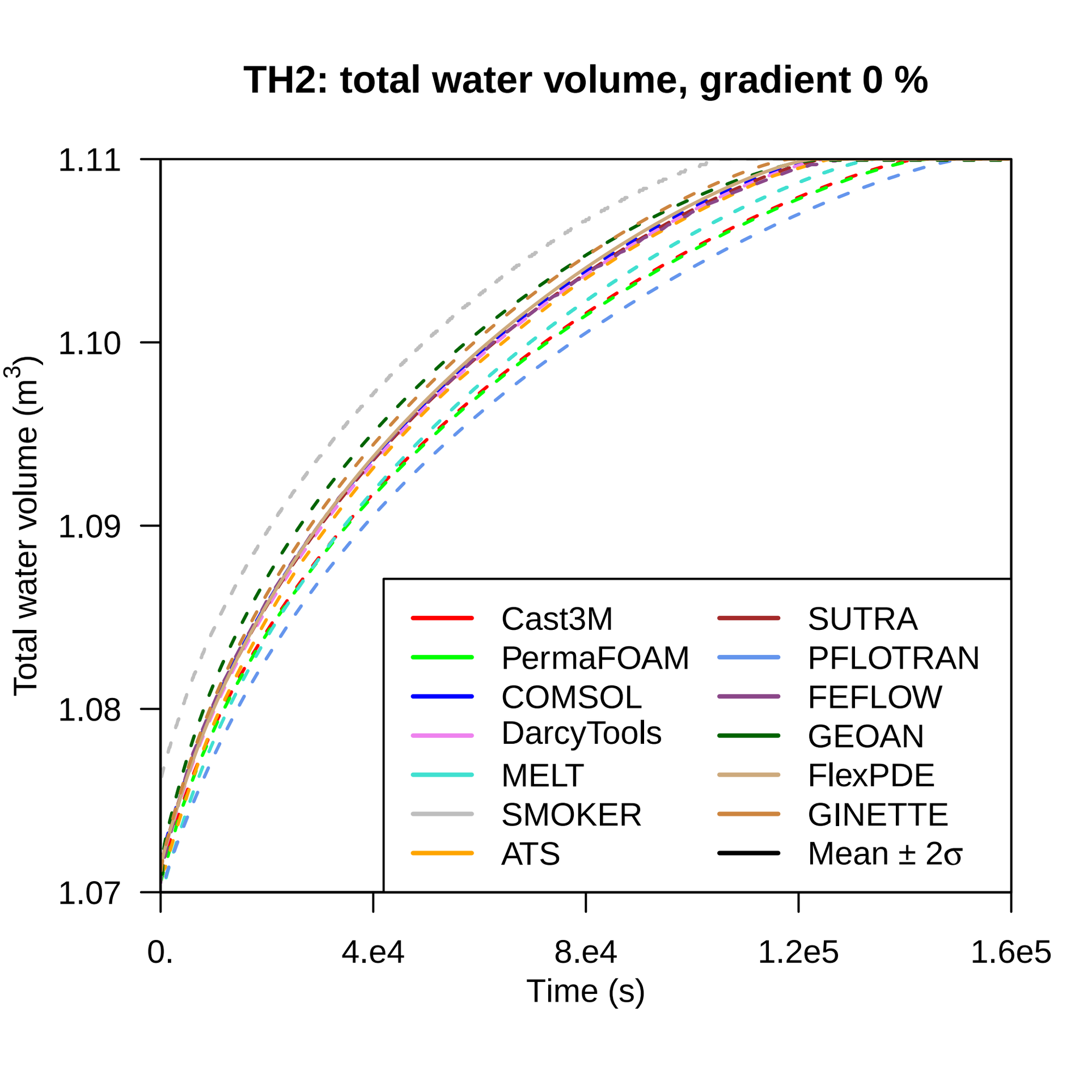

TH2: total heat flux, gradient 3 %
0
−100
−200
−300
−400
−500
−600
−700
Total flux (W)
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

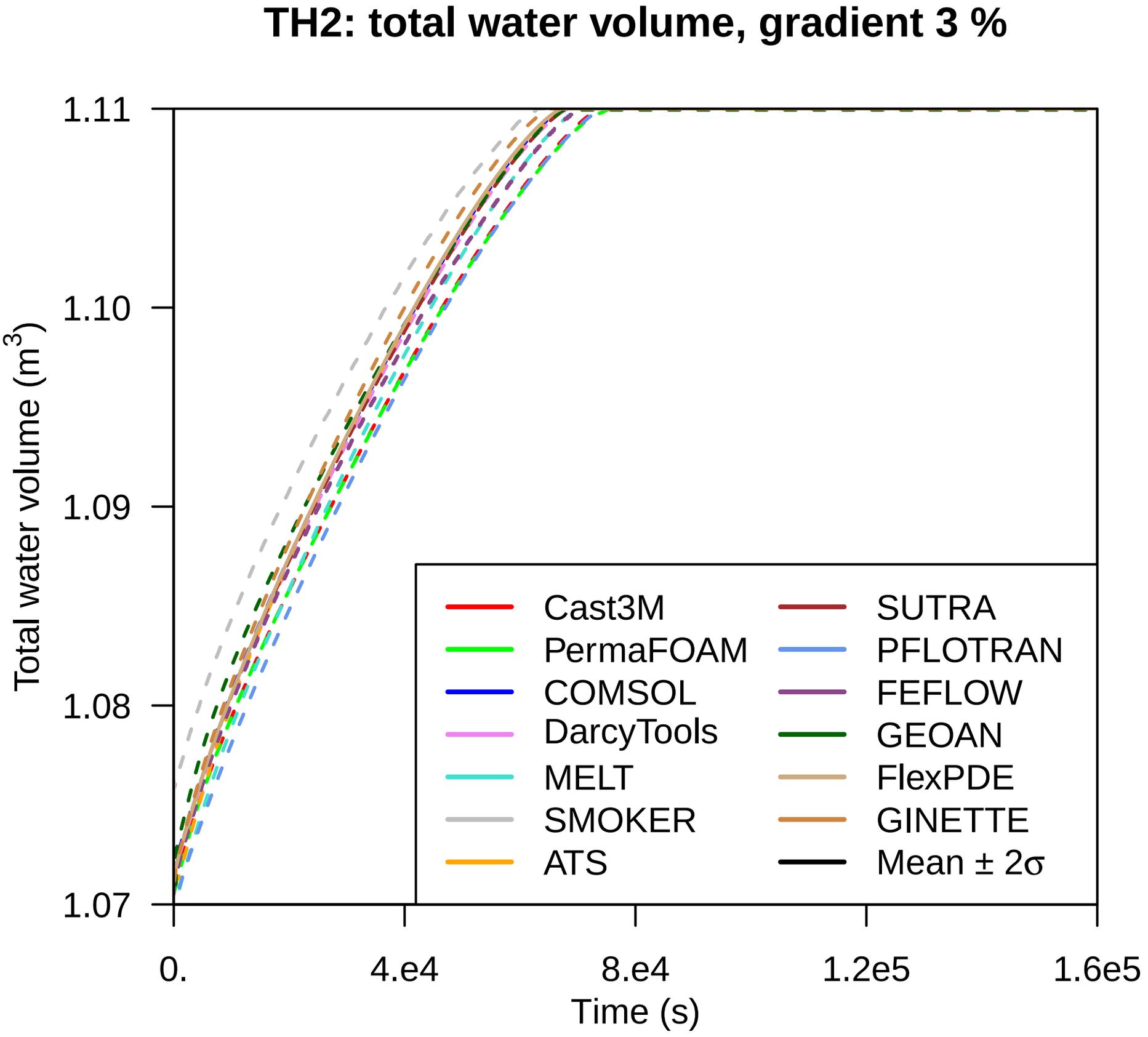

TH2: total heat flux, gradient 9 %
0
−100
−200
−300
−400
−500
−600
−700
Total flux (W)
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

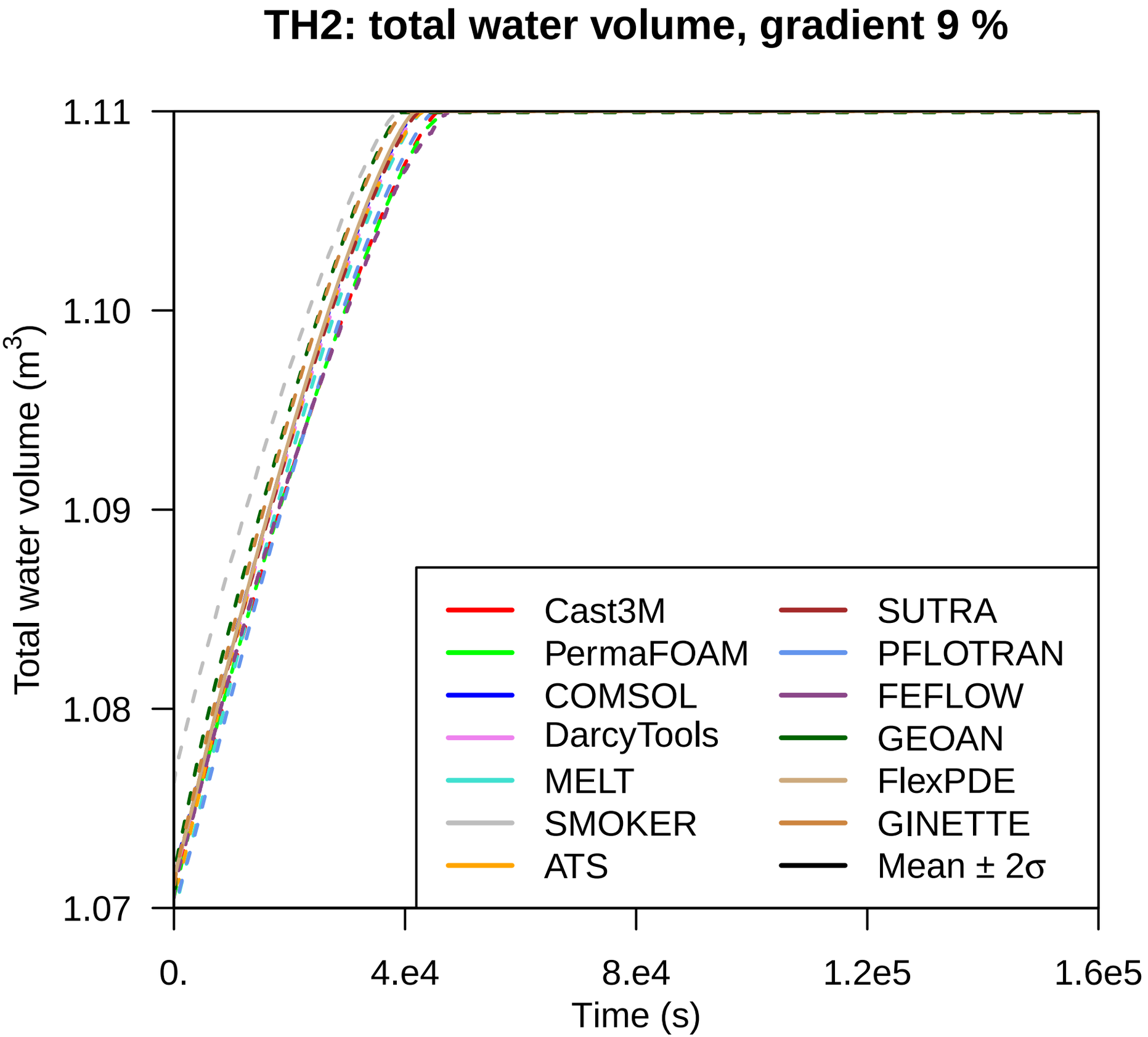

TH2: total heat flux, gradient 15 %
0
−200
−400
−600
−800
Total flux (W)
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

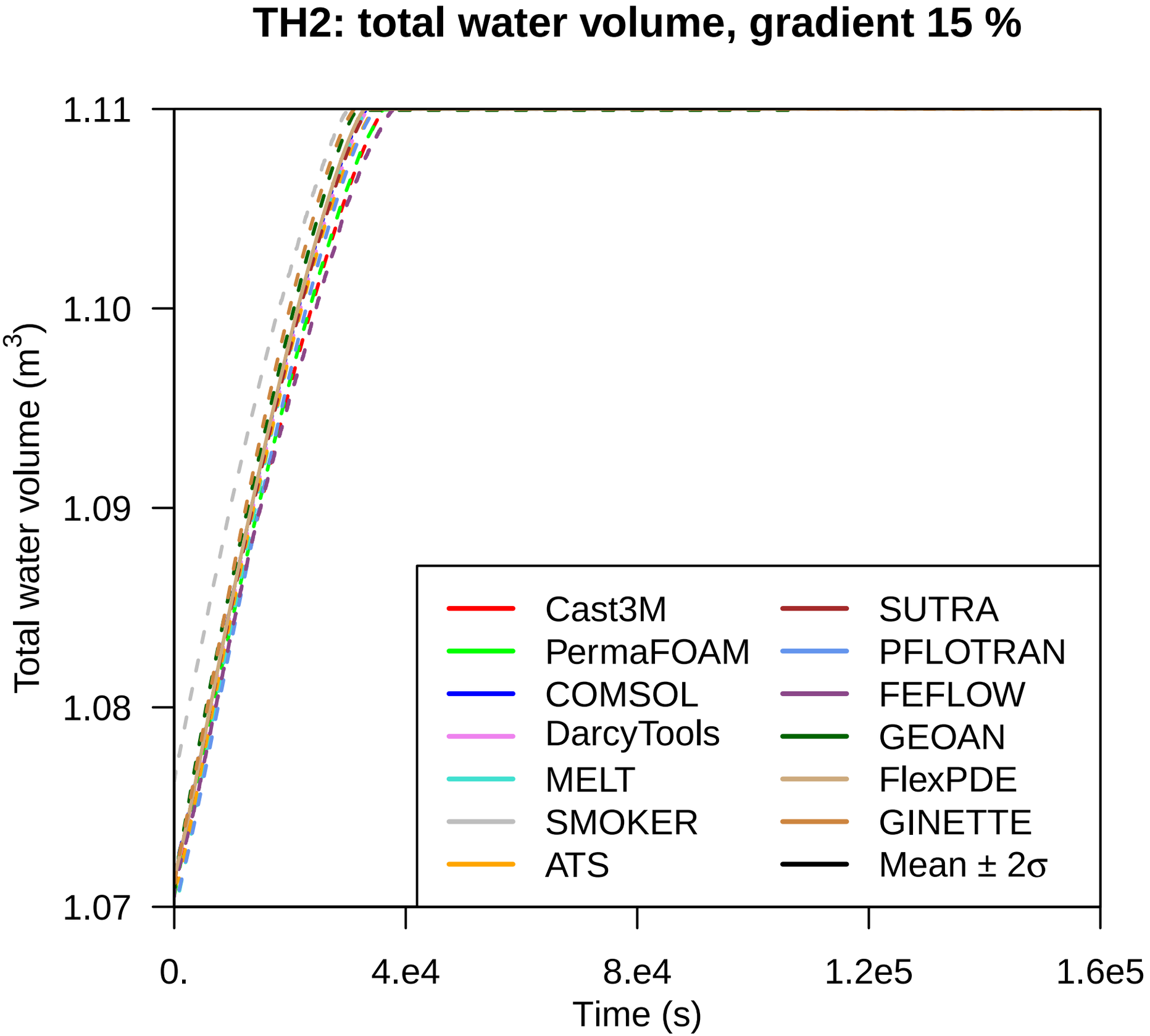

TH2_PM2: Standard deviations for all gradients
GH_0.00
GH_0.09
GH_0.03
GH_0.15
Standard deviation (°C)
0
10
20
30
40
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)

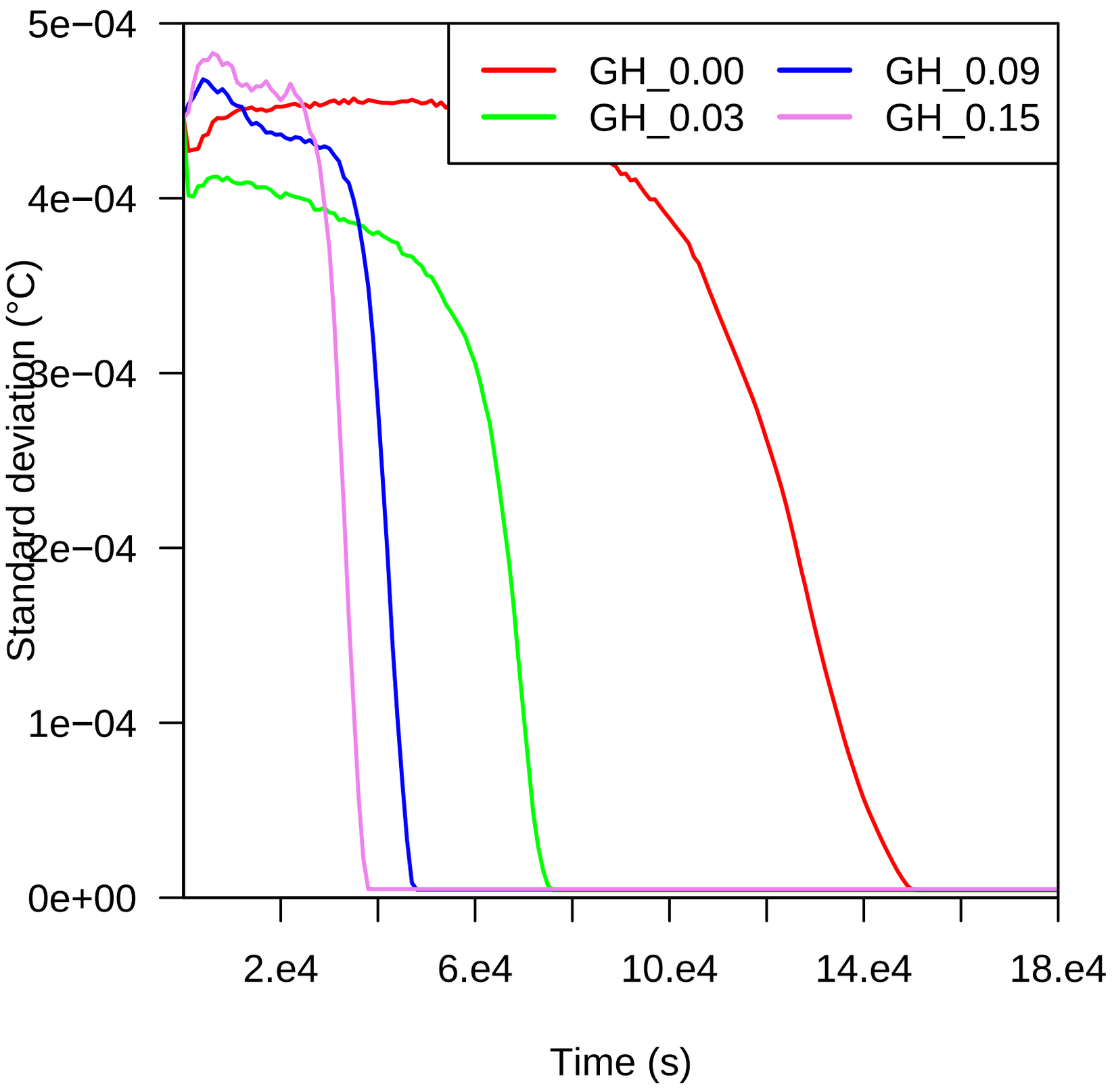

TH2_PM2: Std. Dev. / Max(Mean) for all grad.
0.5
0.4
0.3
0.2
0.1
0.0
Standard deviation (°C)
GH_0.00
GH_0.03
GH_0.09
GH_0.15
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)

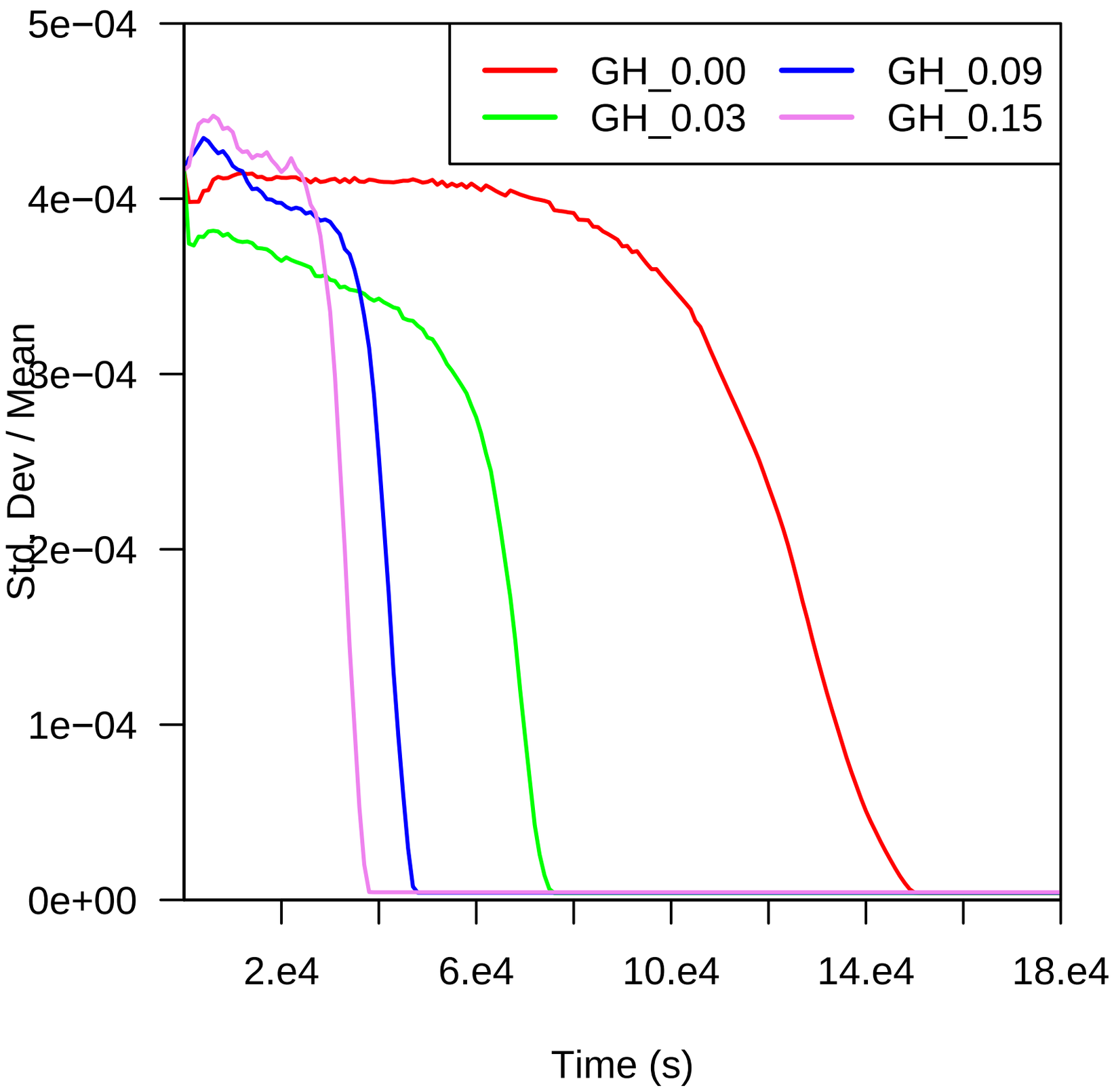

TH2: total water volume, gradient 0 %
1.11
1.10
1.09
1.08
1.07
Total water volume (m3)
0.
4.e4
8.e4
1.2e5
1.6e5
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

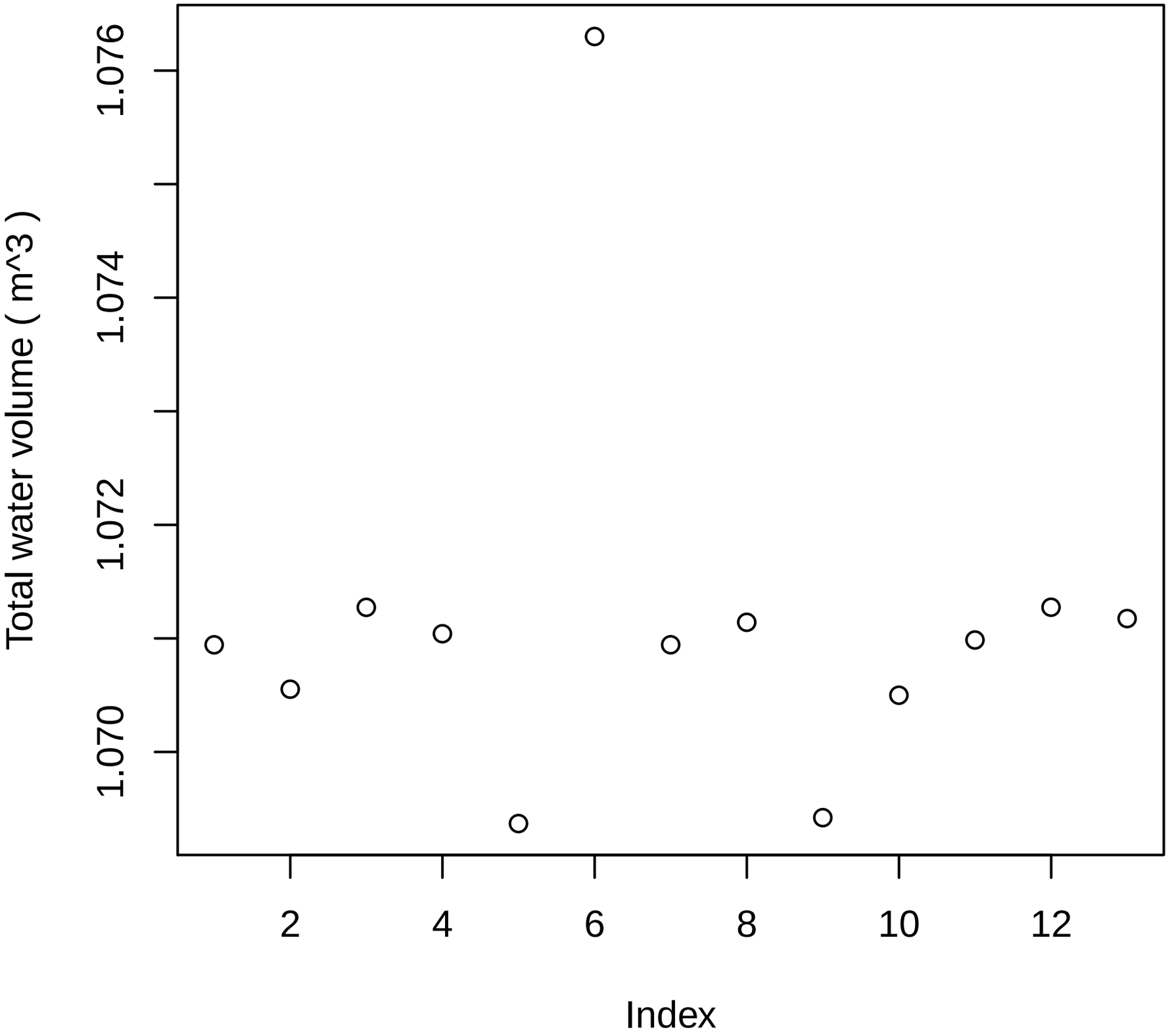

TH2: total water volume, gradient 3 %
1.11
1.10
1.09
1.08
1.07
Total water volume (m3)
0.
4.e4
8.e4
1.2e5
1.6e5
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

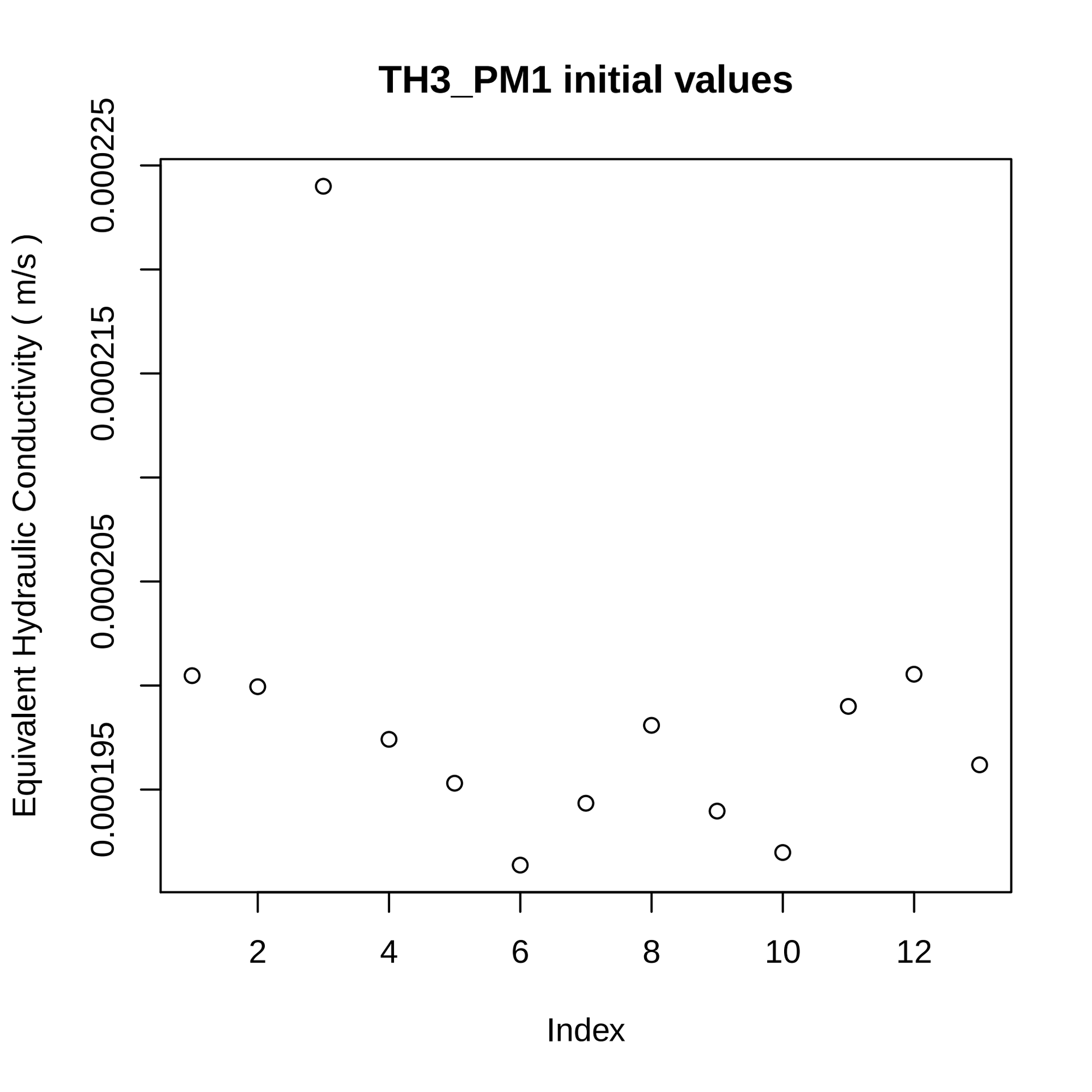

TH2: total water volume, gradient 9 %
1.11
1.10
1.09
1.08
1.07
Total water volume (m3)
0.
4.e4
8.e4
1.2e5
1.6e5
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

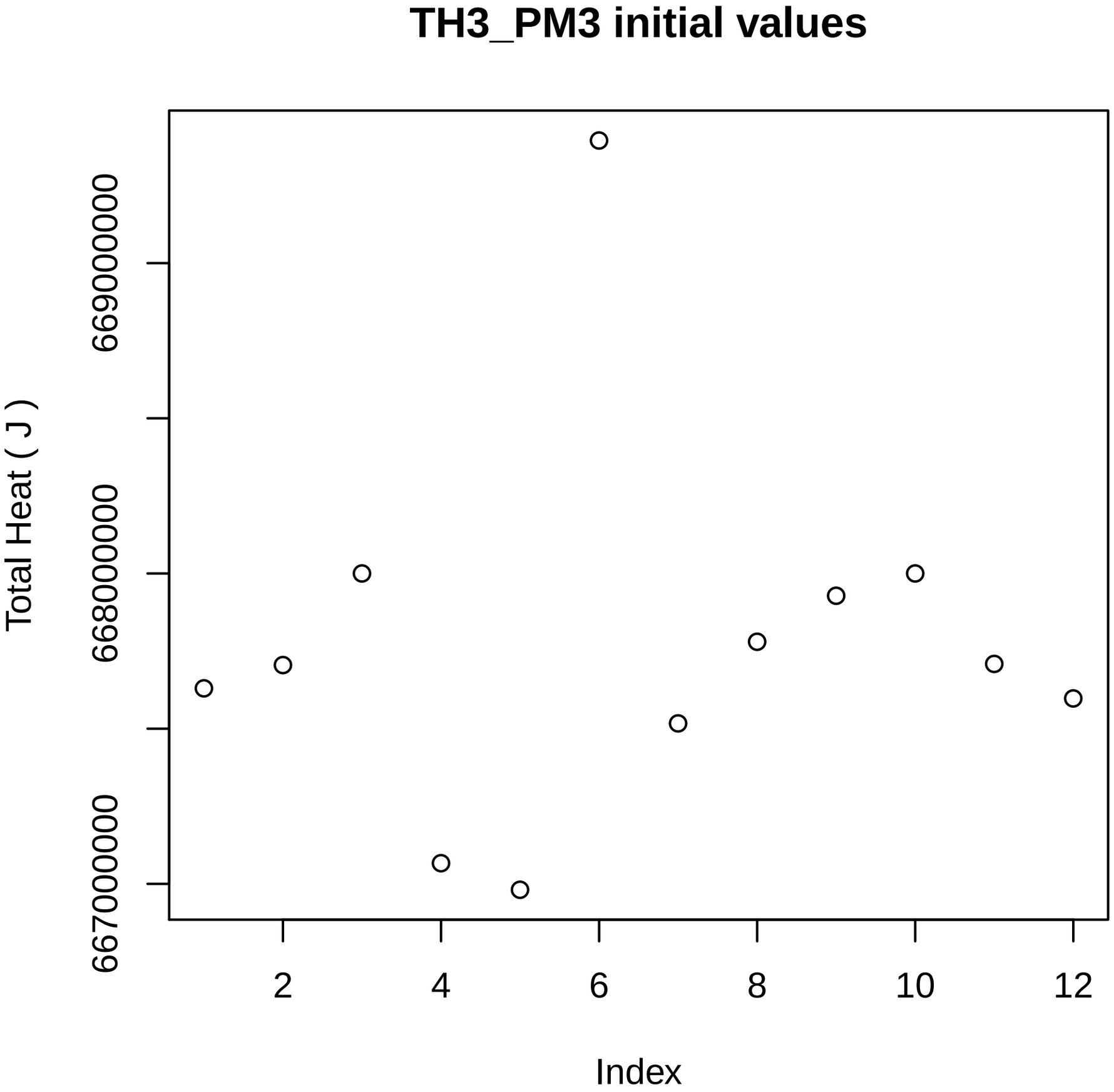

TH2: total water volume, gradient 15 %
1.11
1.10
1.09
1.08
1.07
Total water volume (m3)
0.
4.e4
8.e4
1.2e5
1.6e5
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Mean ± 2σ

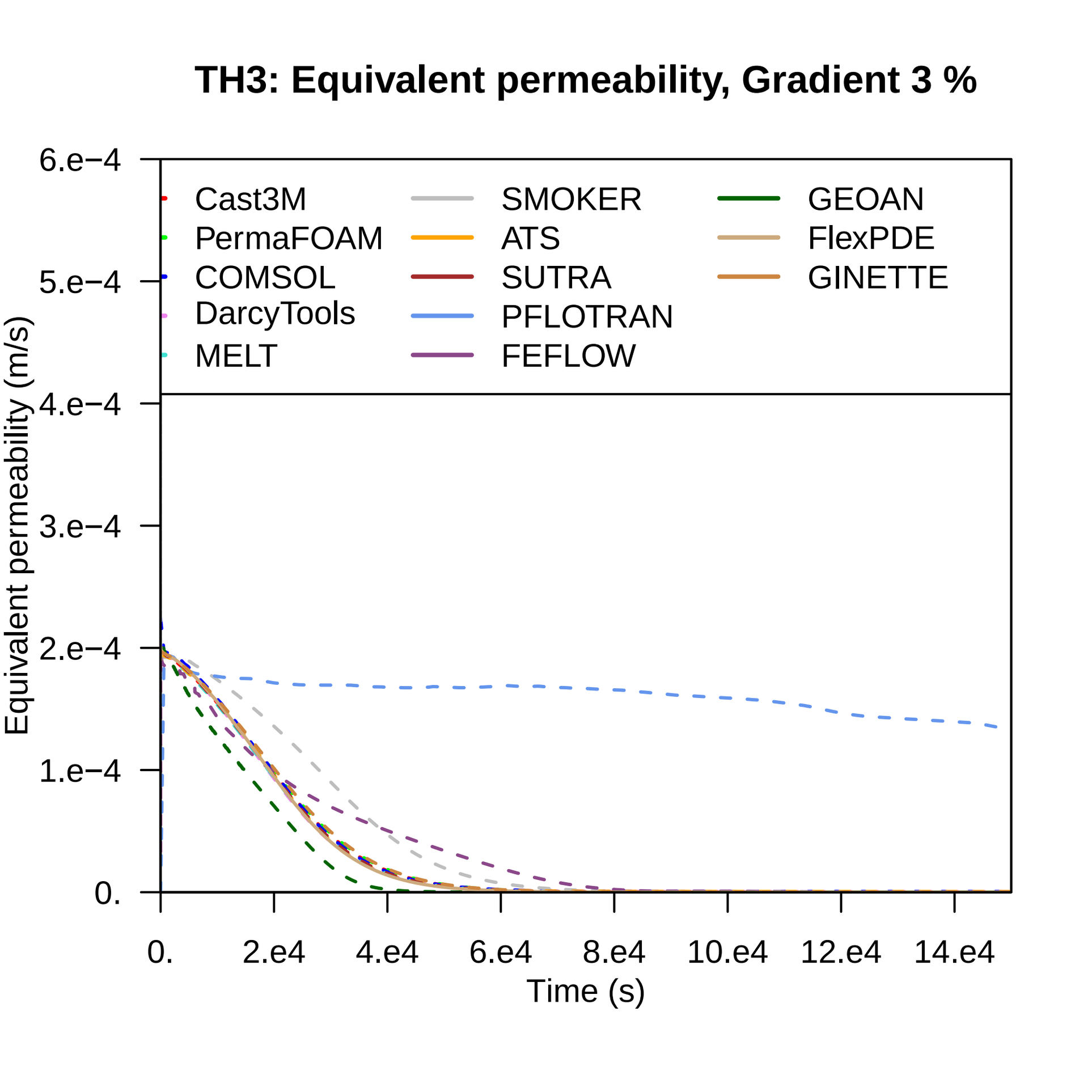

TH2_PM3: Standard Deviation for all gradients
GH_0.00
GH_0.09
GH_0.03
GH_0.15
5e−04
4e−04
3e−04
2e−04
1e−04
0e+00
Standard deviation (°C)
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)

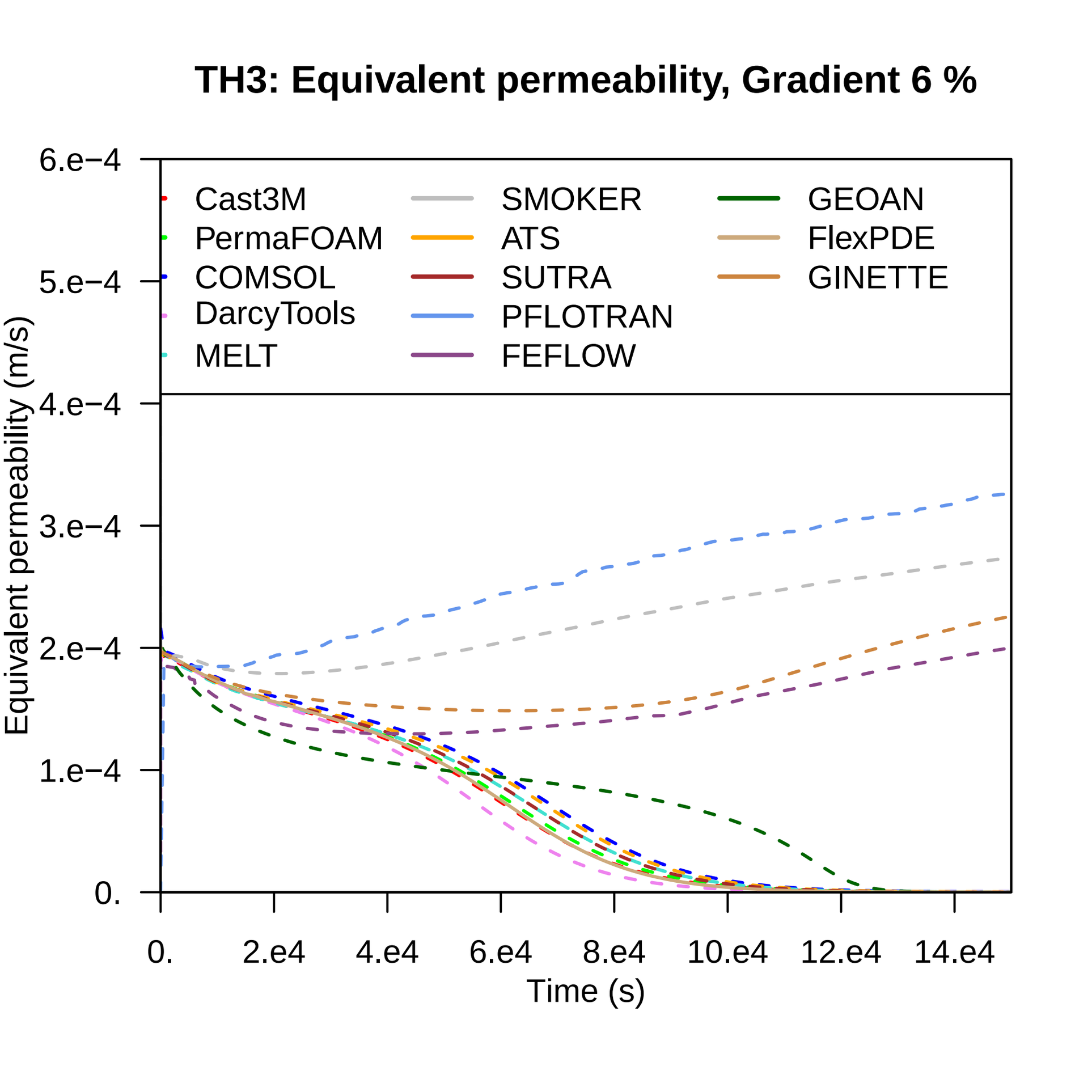

TH2_PM3: Standard Dev. / Mean evolution for all grad
GH_0.00
GH_0.09
GH_0.03
GH_0.15
5e−04
4e−04
3e−04
2e−04
1e−04
0e+00
Std. Dev / Mean
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)

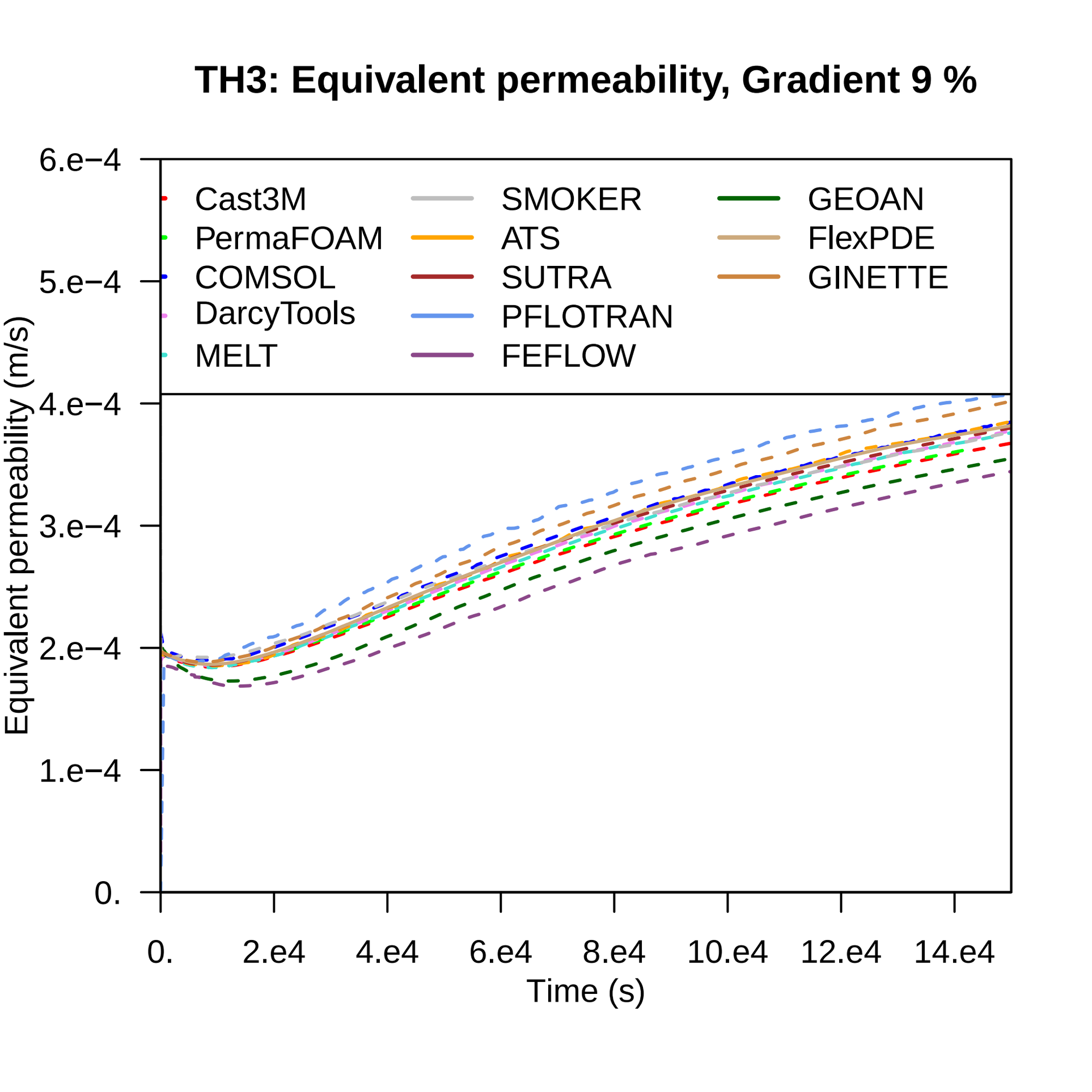

TH2_PM3 initial values
Total water volume (m^3)
1.070
1.072
1.074
1.076
2
4
6
8
10
12
Index

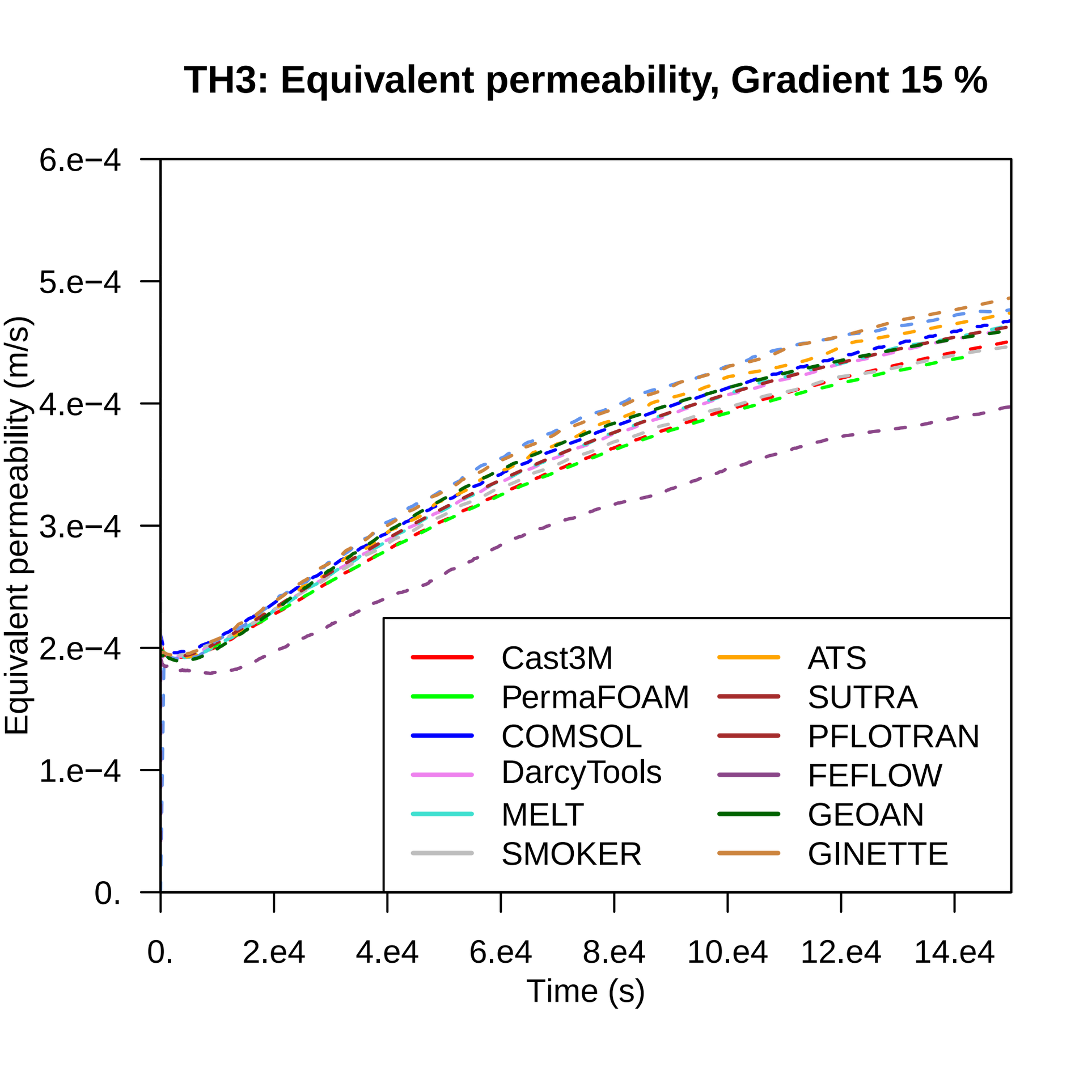

TH3_PM1 initial values
Equivalent Hydraulic Conductivity (m/s)
0.000195
0.000205
0.000215
0.000225
2
4
6
8
10
12
Index

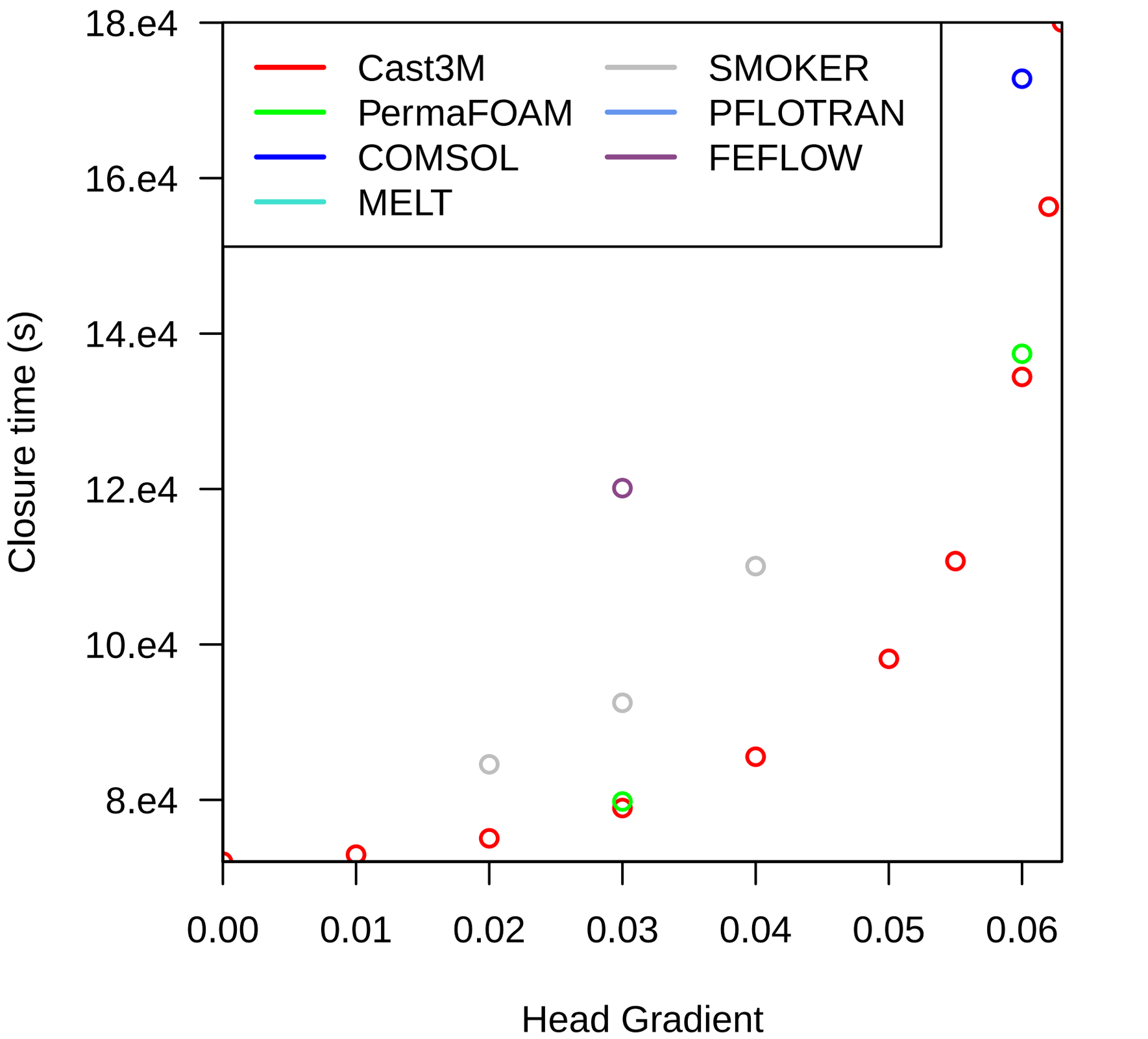

TH3_PM3 initial values
Total Heat (J)
669000000
668000000
667000000
2
4
6
8
10
12
Index

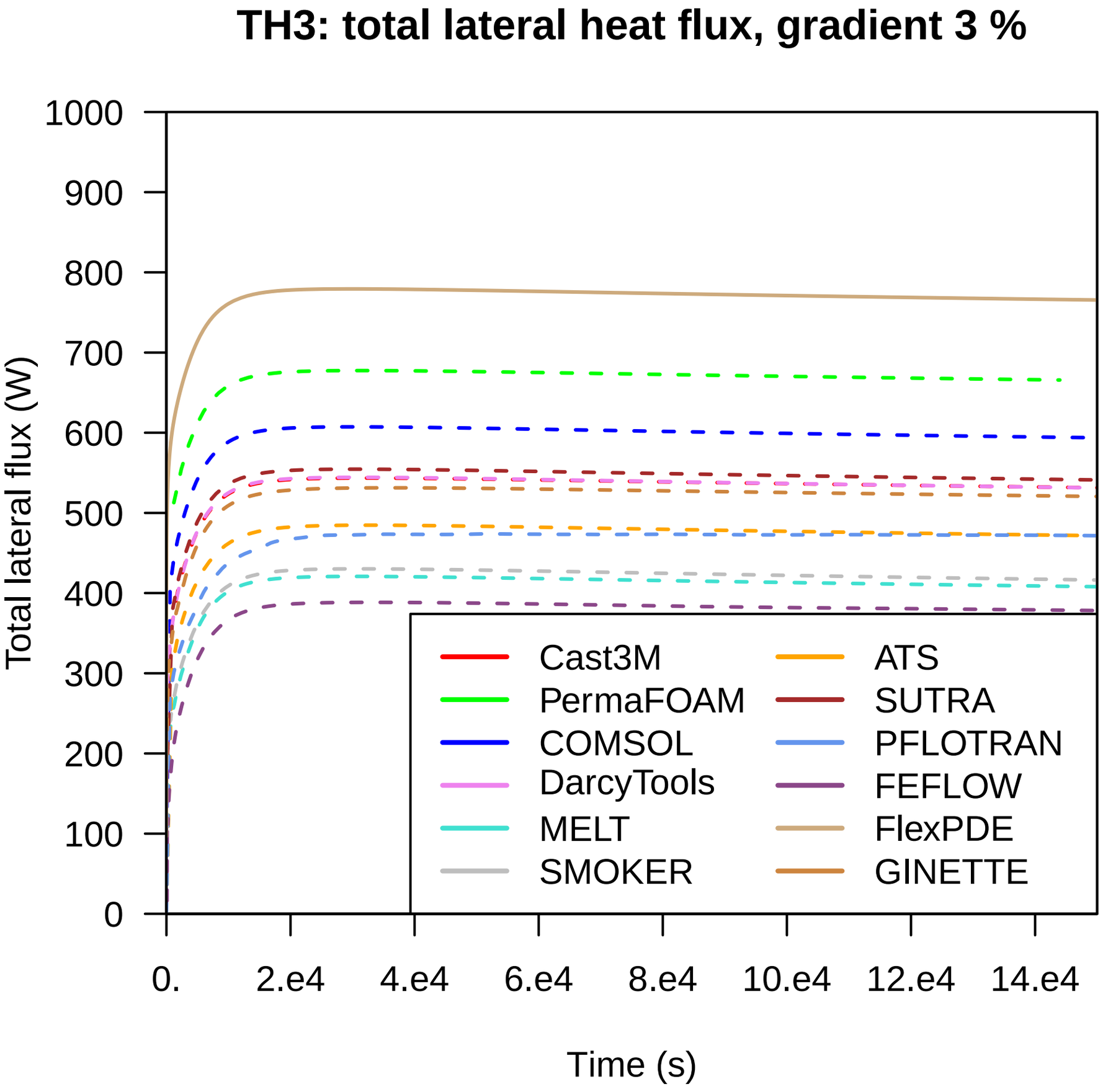

TH3: Equivalent permeability, Gradient 3 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Equivalent permeability (m/s)
6.e−4
5.e−4
4.e−4
3.e−4
2.e−4
1.e−4
0.
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)

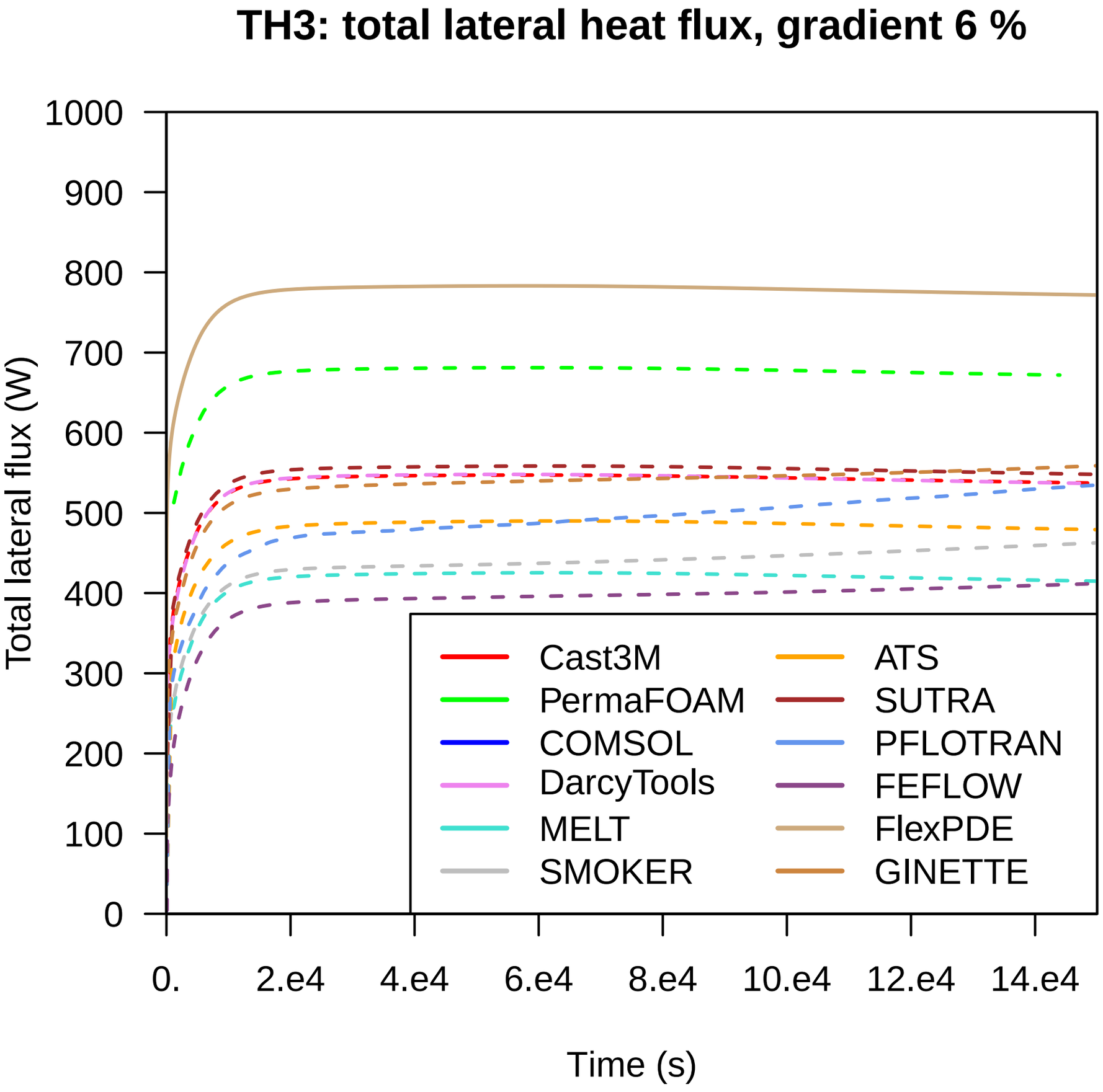

TH3: Equivalent permeability, Gradient 6 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Equivalent permeability (m/s)
6.e−4
5.e−4
4.e−4
3.e−4
2.e−4
1.e−4
0.
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)

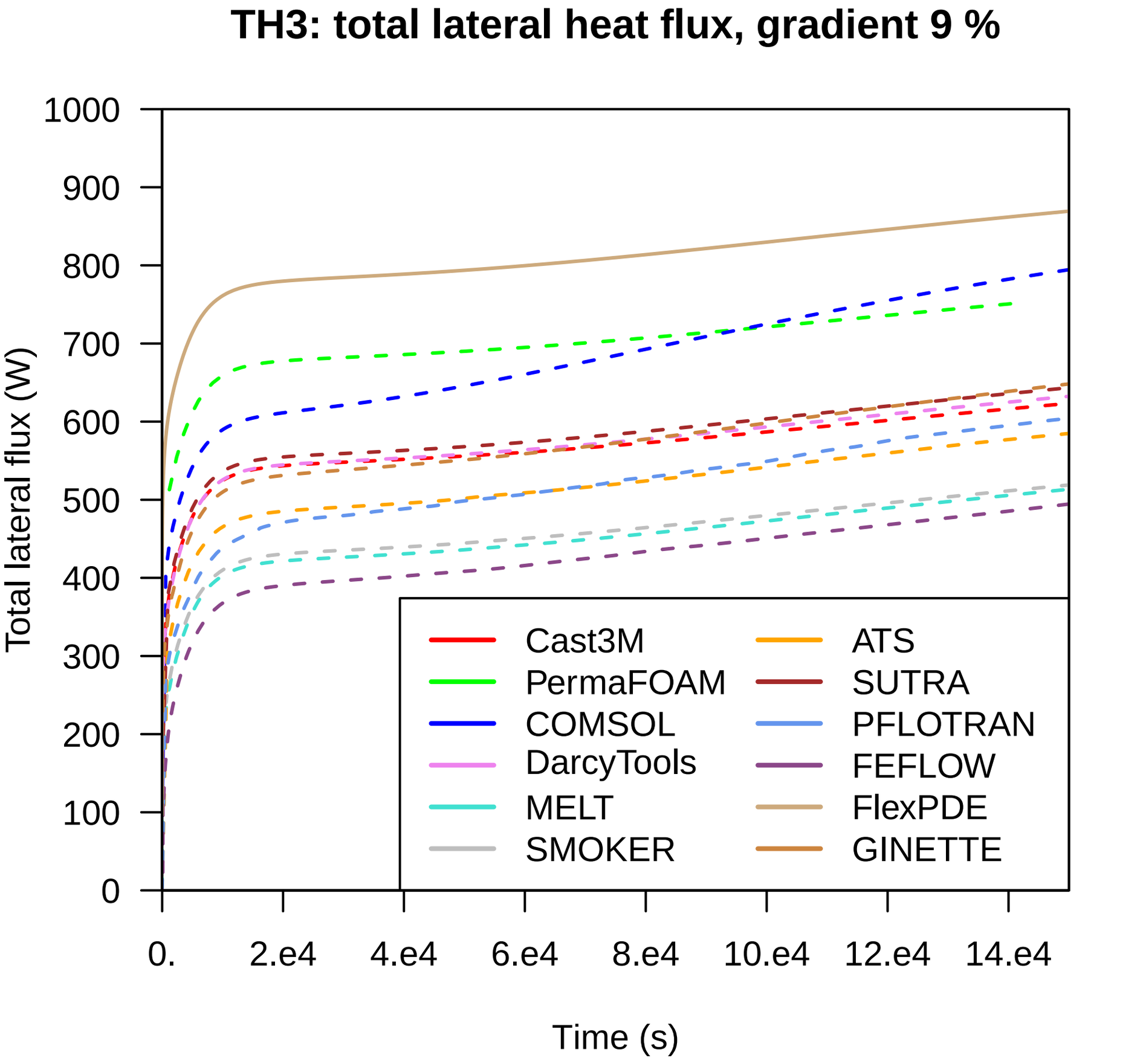

TH3: Equivalent permeability, Gradient 9 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Equivalent permeability (m/s)
6.e−4
5.e−4
4.e−4
3.e−4
2.e−4
1.e−4
0.
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)

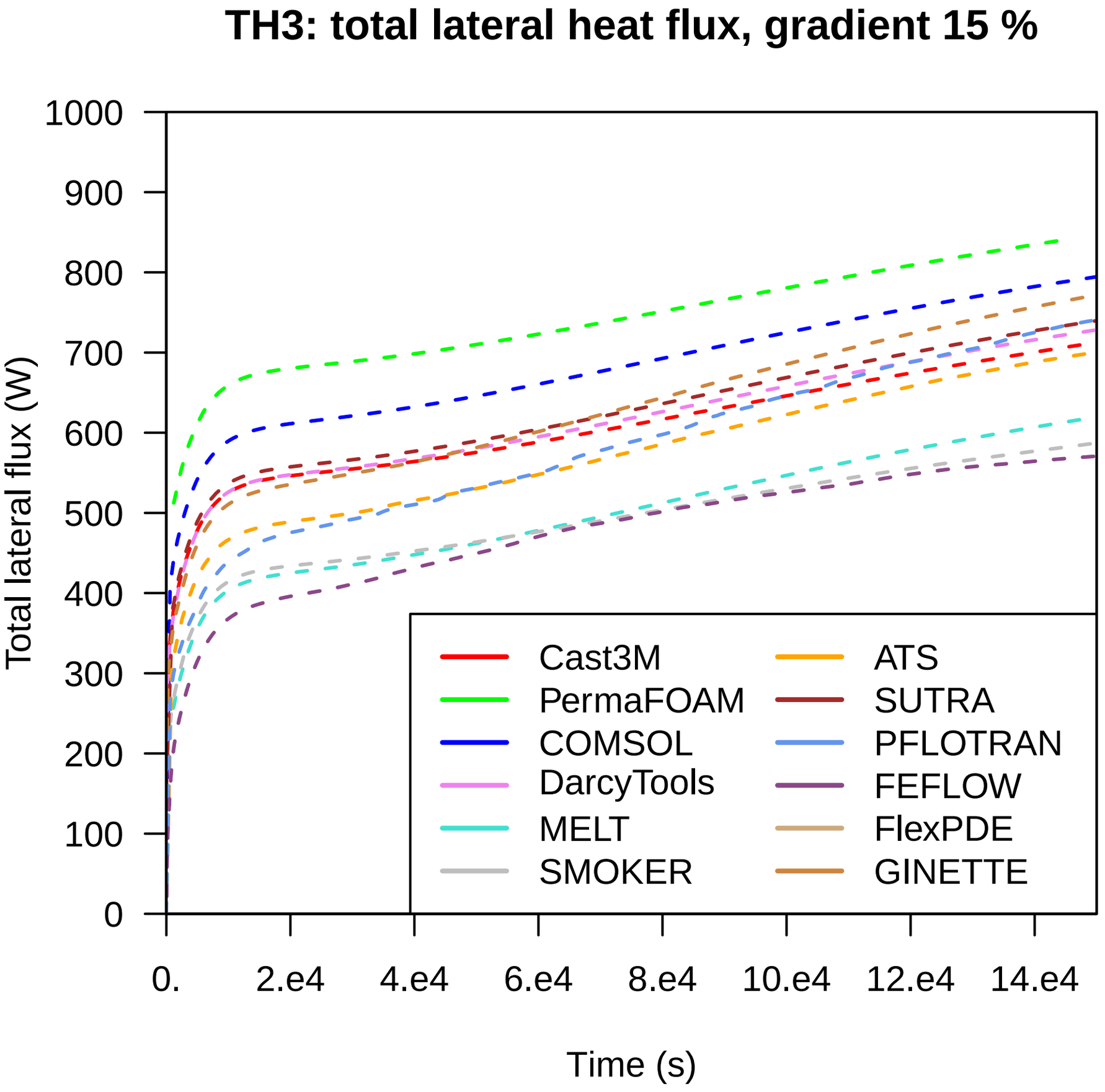

TH3: Equivalent permeability, Gradient 15 %
Equivalent permeability (m/s)
6.e−4
5.e−4
4.e−4
3.e−4
2.e−4
1.e−4
0.
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
GINETTE

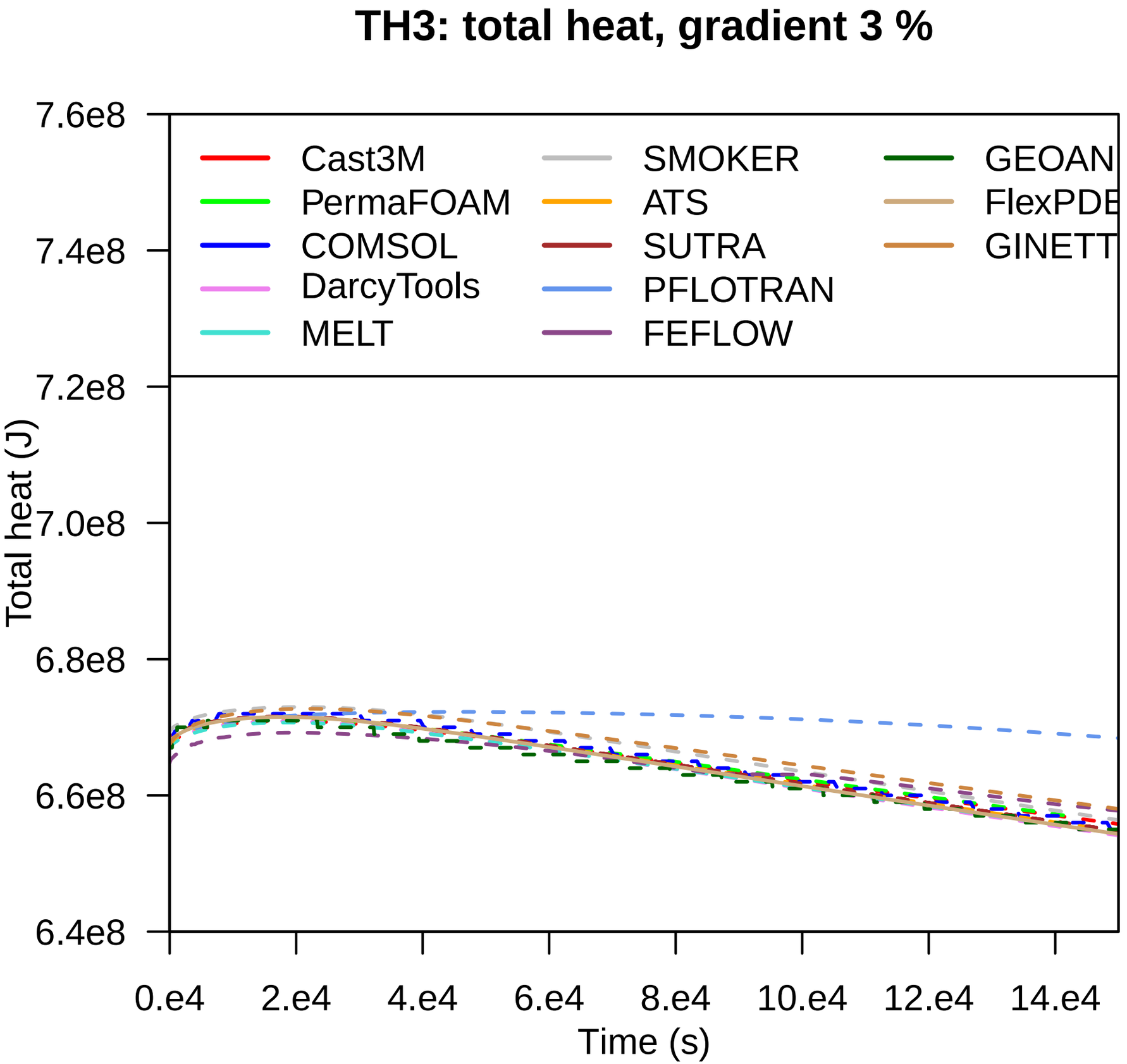

TH3: Closure time function of head gradient
Cast3M
PermaFOAM
COMSOL
MELT
SMOKER
PFLOTRAN
FEFLOW
18.e4
16.e4
14.e4
12.e4
10.e4
8.e4
Closure time (s)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
Head Gradient

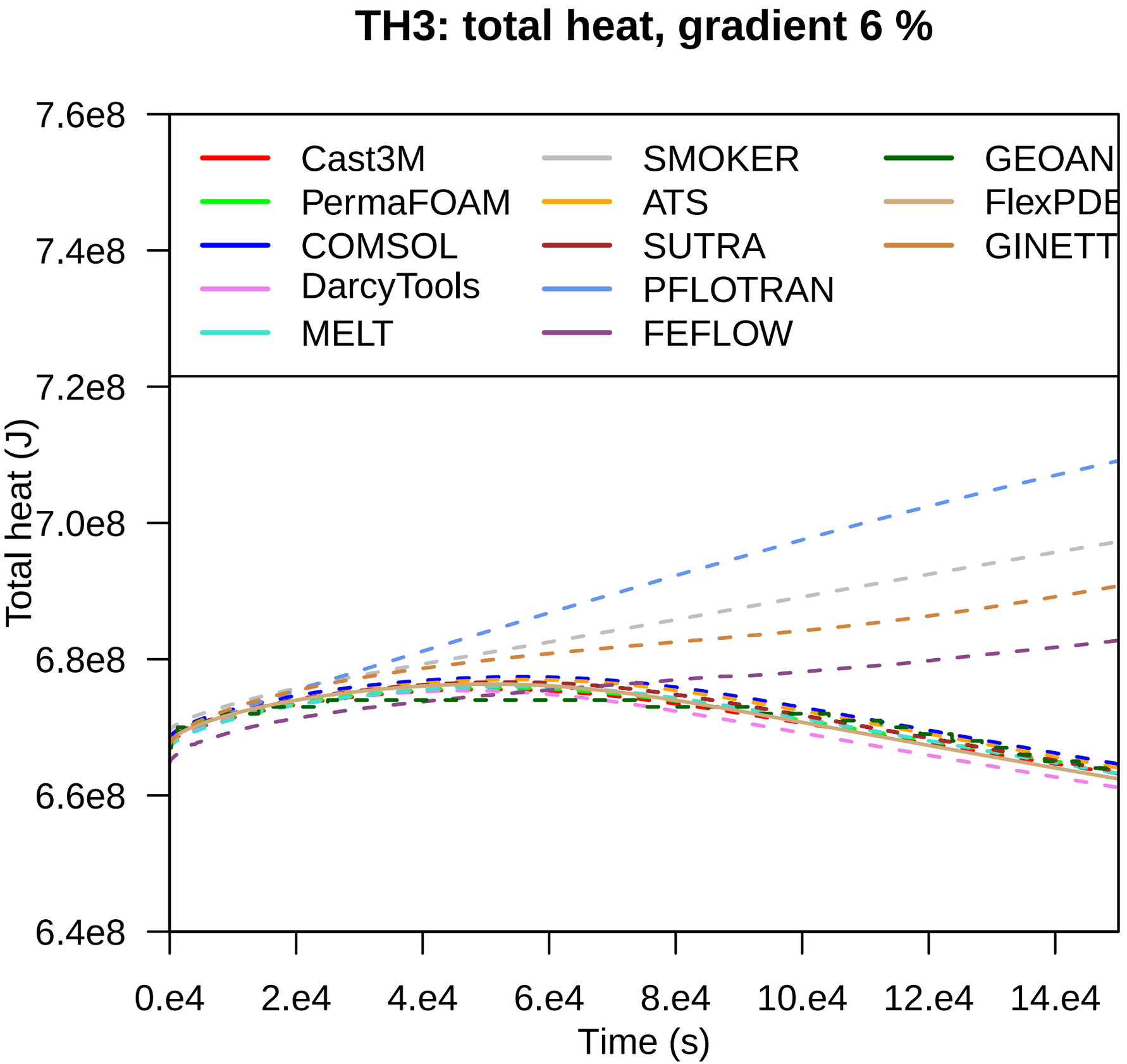

TH3: total lateral heat flux, gradient 3 %
Total lateral flux (W)
1000
900
800
700
600
500
400
300
200
100
0
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
FlexPDE
GINETTE

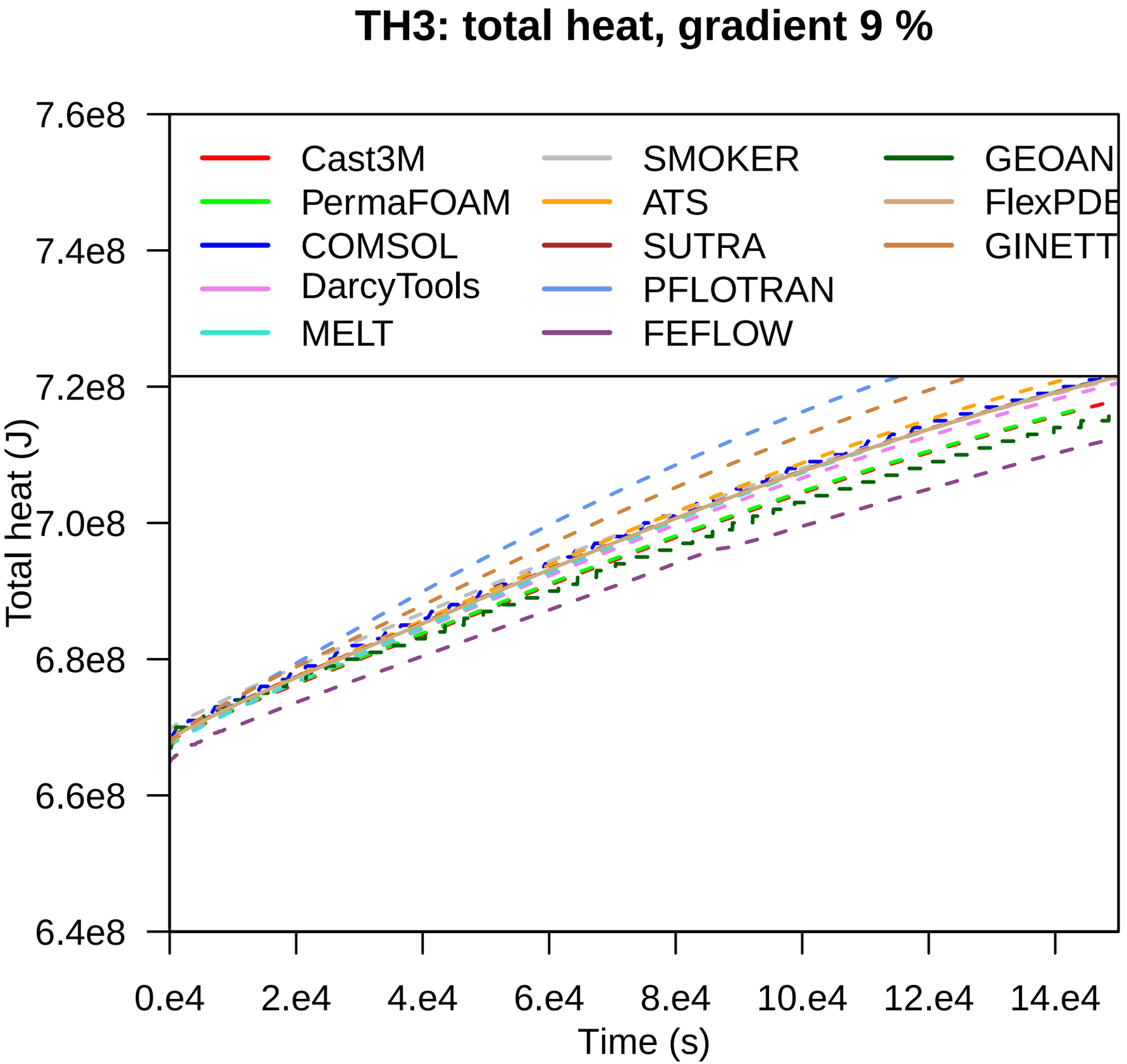

TH3: total lateral heat flux, gradient 6 %
Total lateral flux (W)
1000
900
800
700
600
500
400
300
200
100
0
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
FlexPDE
GINETTE

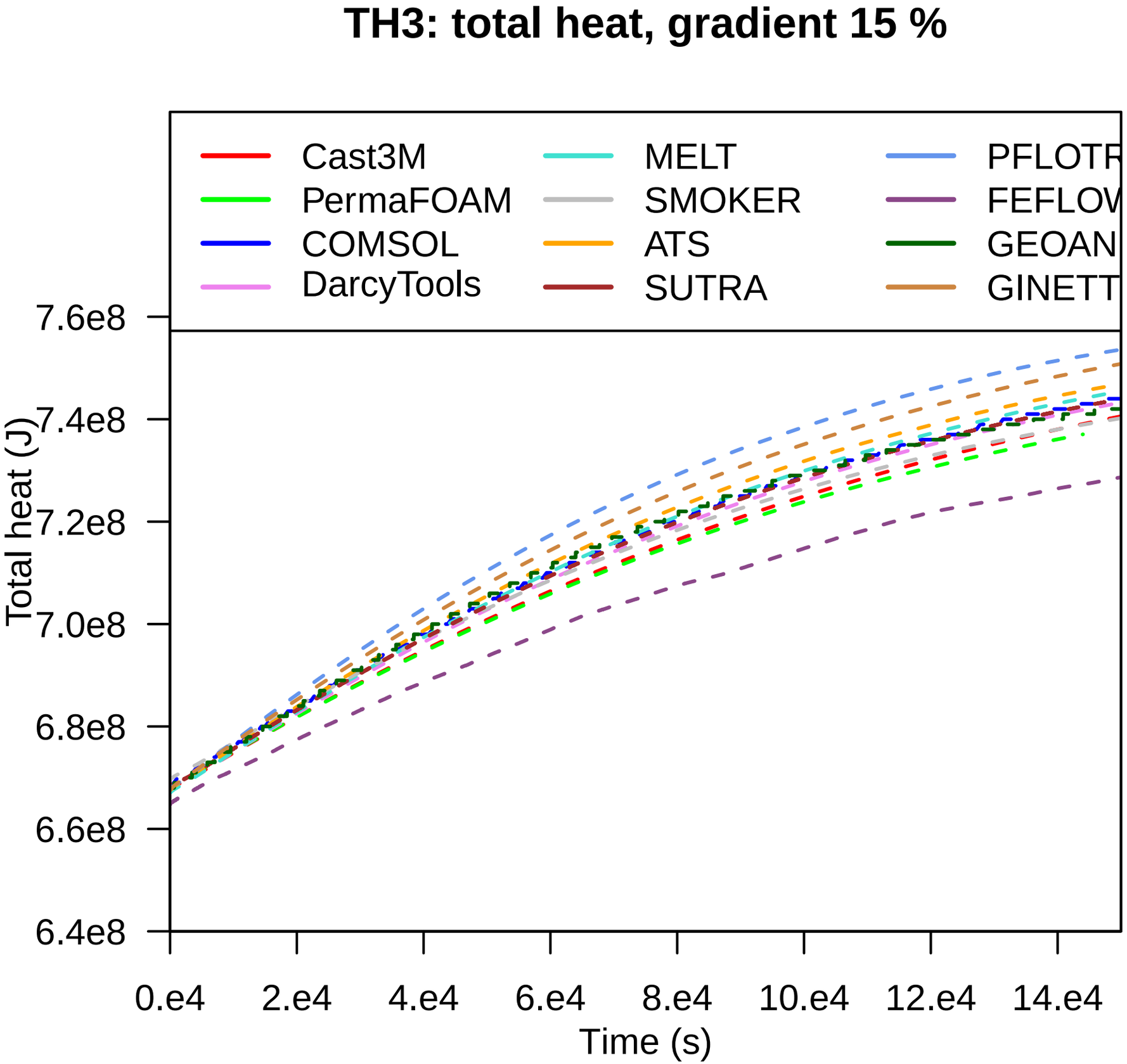

TH3: total lateral heat flux, gradient 9 %
Total lateral flux (W)
1000
900
800
700
600
500
400
300
200
100
0
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
FlexPDE
GINETTE

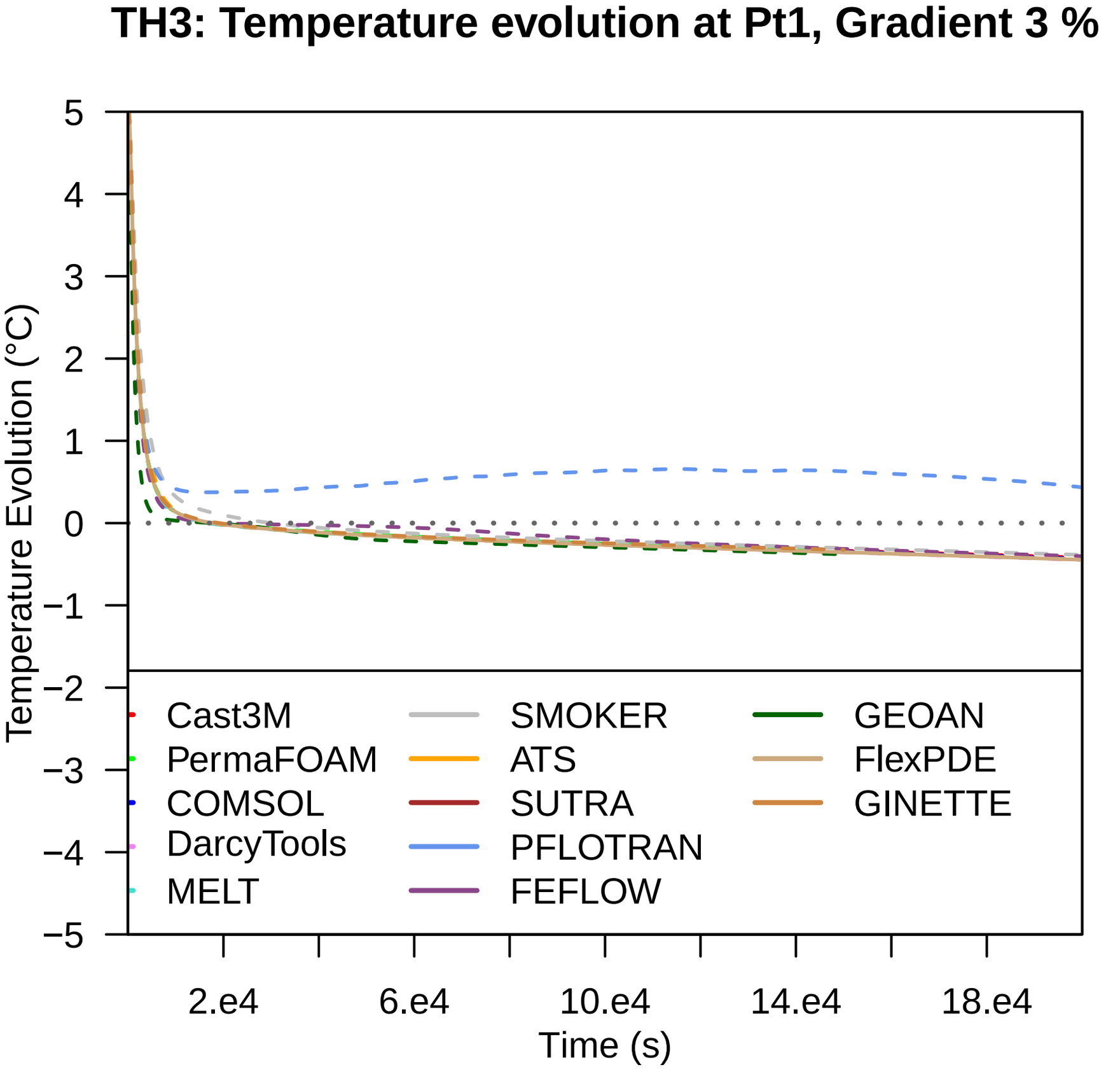

TH3: total lateral heat flux, gradient 15 %
Total lateral flux (W)
1000
900
800
700
600
500
400
300
200
100
0
0.
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
FlexPDE
GINETTE

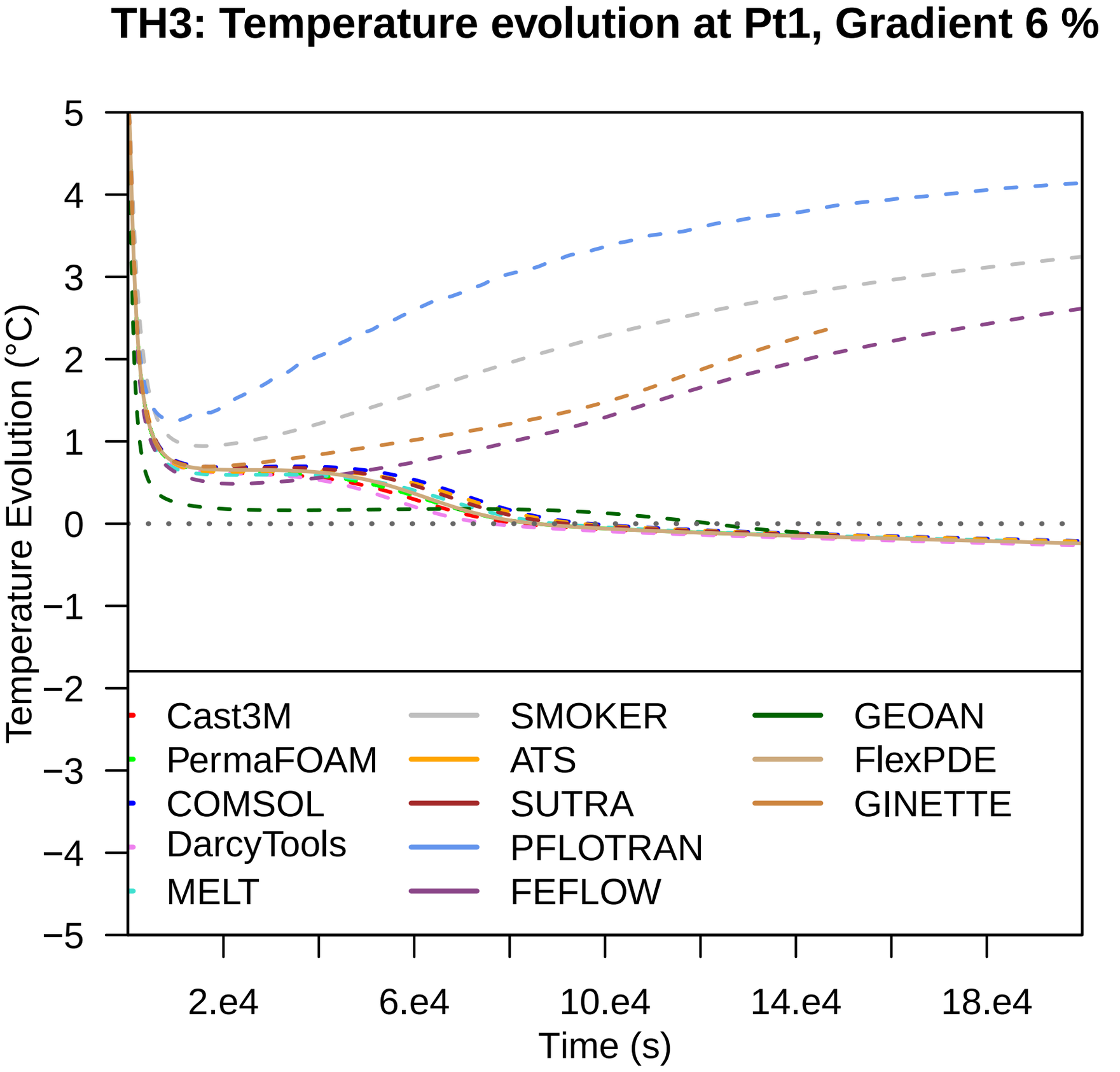

TH3: total heat, gradient 3 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETT
7.6e8
7.4e8
7.2e8
7.0e8
6.8e8
6.6e8
6.4e8
Total heat (J)
0.e4
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)

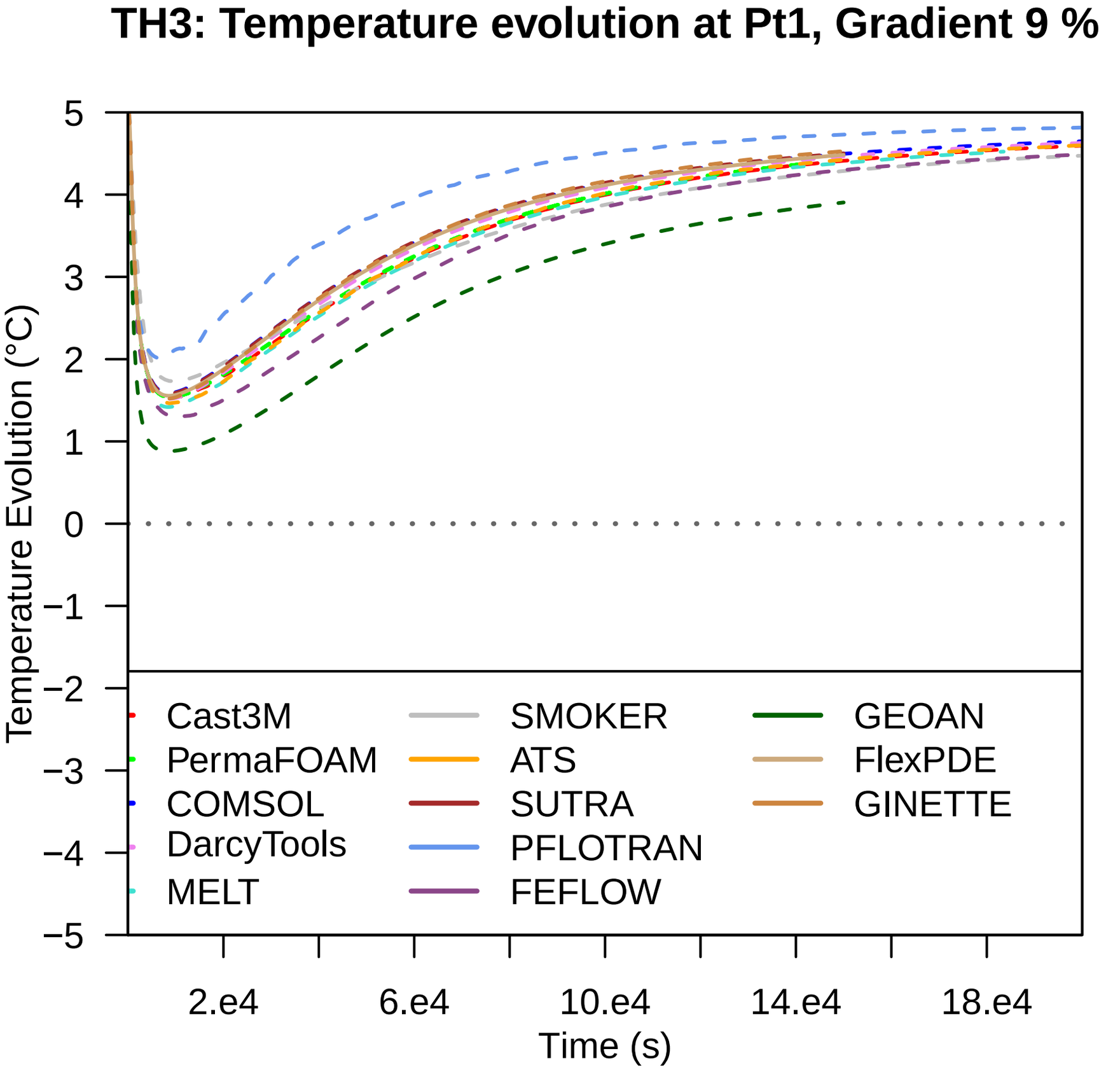

TH3: total heat, gradient 6 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETT
Total heat (J)
7.6e8
7.4e8
7.2e8
7.0e8
6.8e8
6.6e8
6.4e8
0.e4
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)

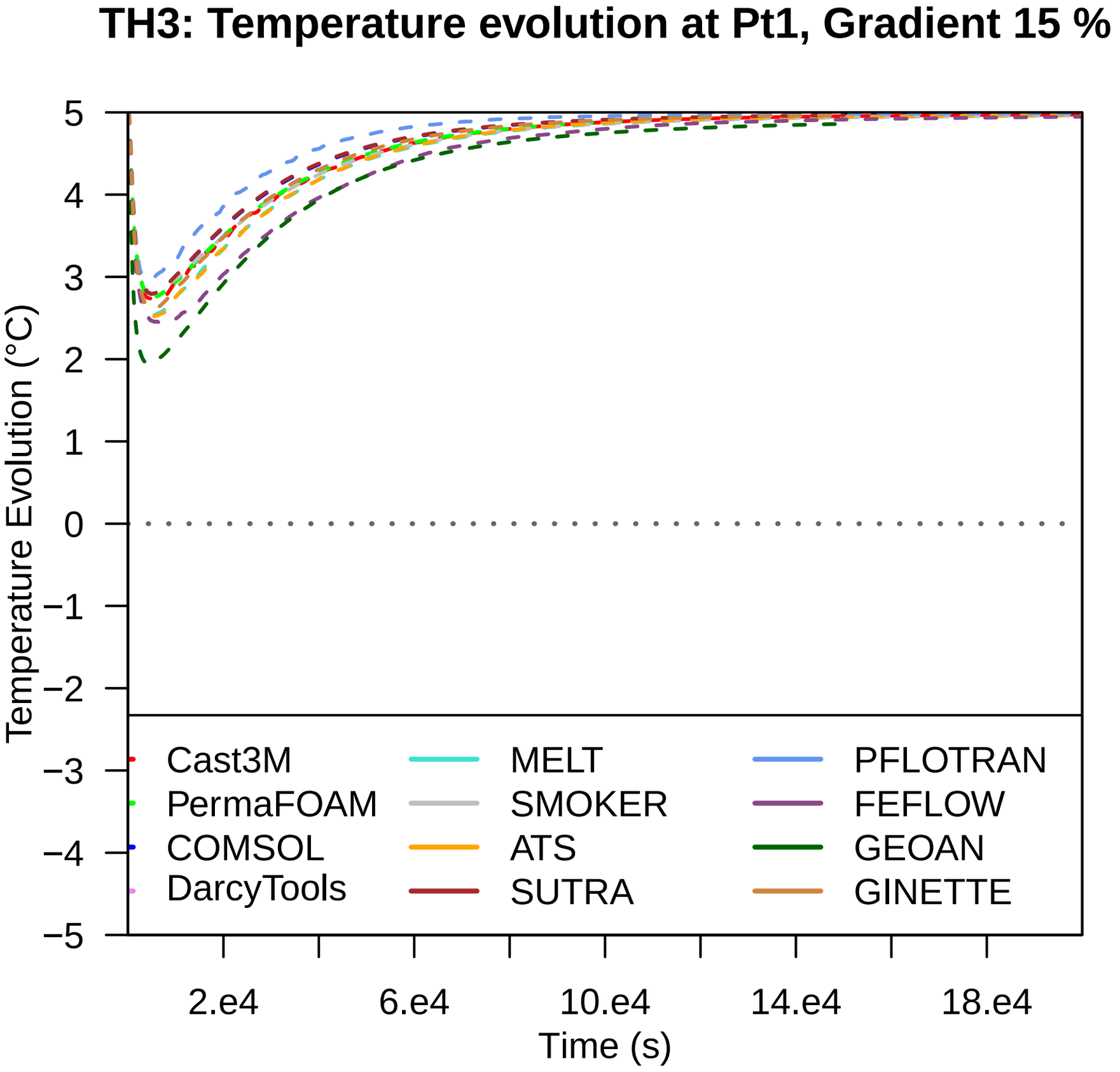

TH3: total heat, gradient 9 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETT
7.6e8
7.4e8
7.2e8
7.0e8
6.8e8
6.6e8
6.4e8
Total heat (J)
0.e4
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)

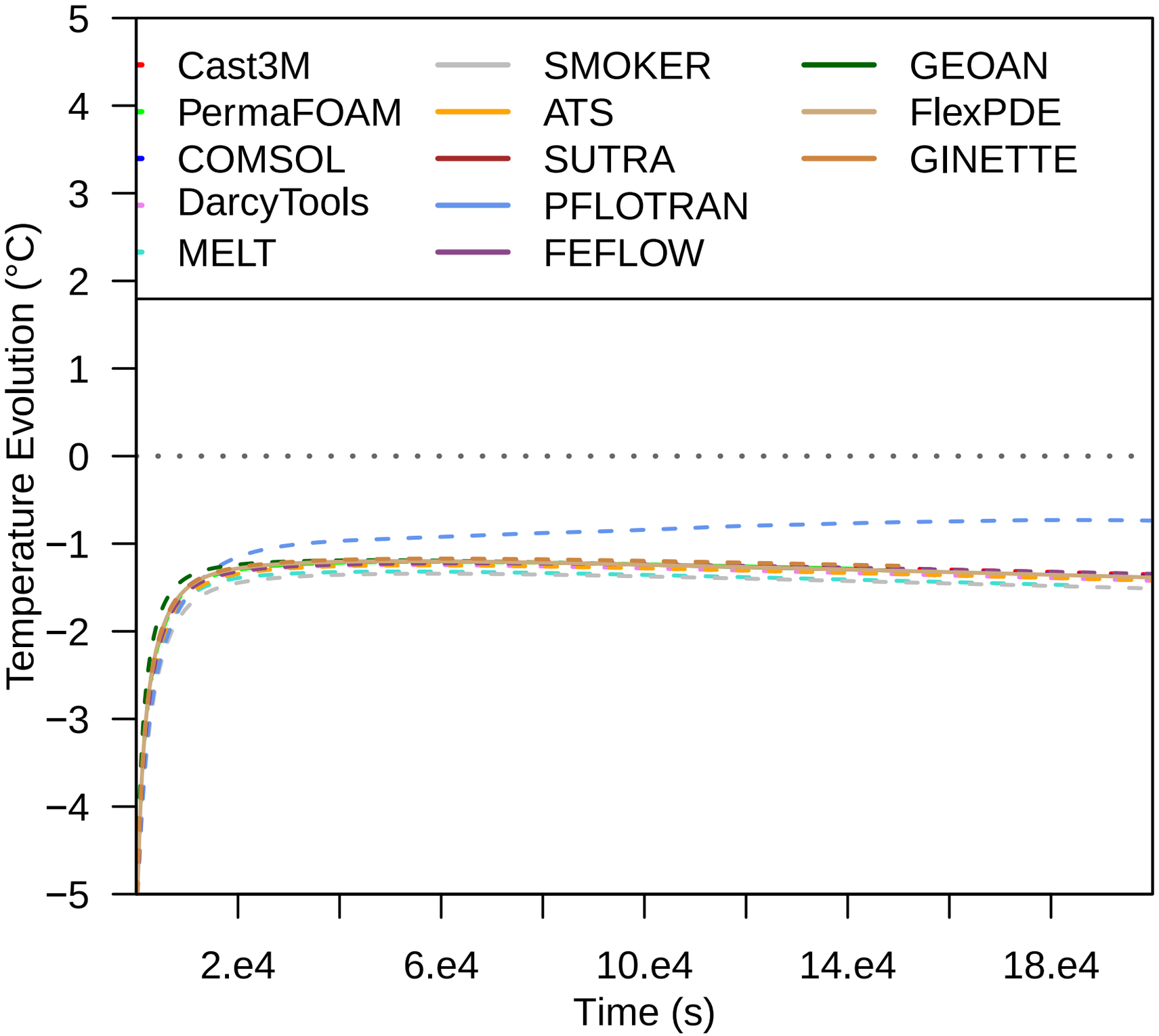

TH3: total heat, gradient 15 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTR
FEFLOW
GEOAN
GINETT
7.6e8
7.4e8
7.2e8
7.0e8
6.8e8
6.6e8
6.4e8
Total heat (J)
0.e4
2.e4
4.e4
6.e4
8.e4
10.e4
12.e4
14.e4
Time (s)

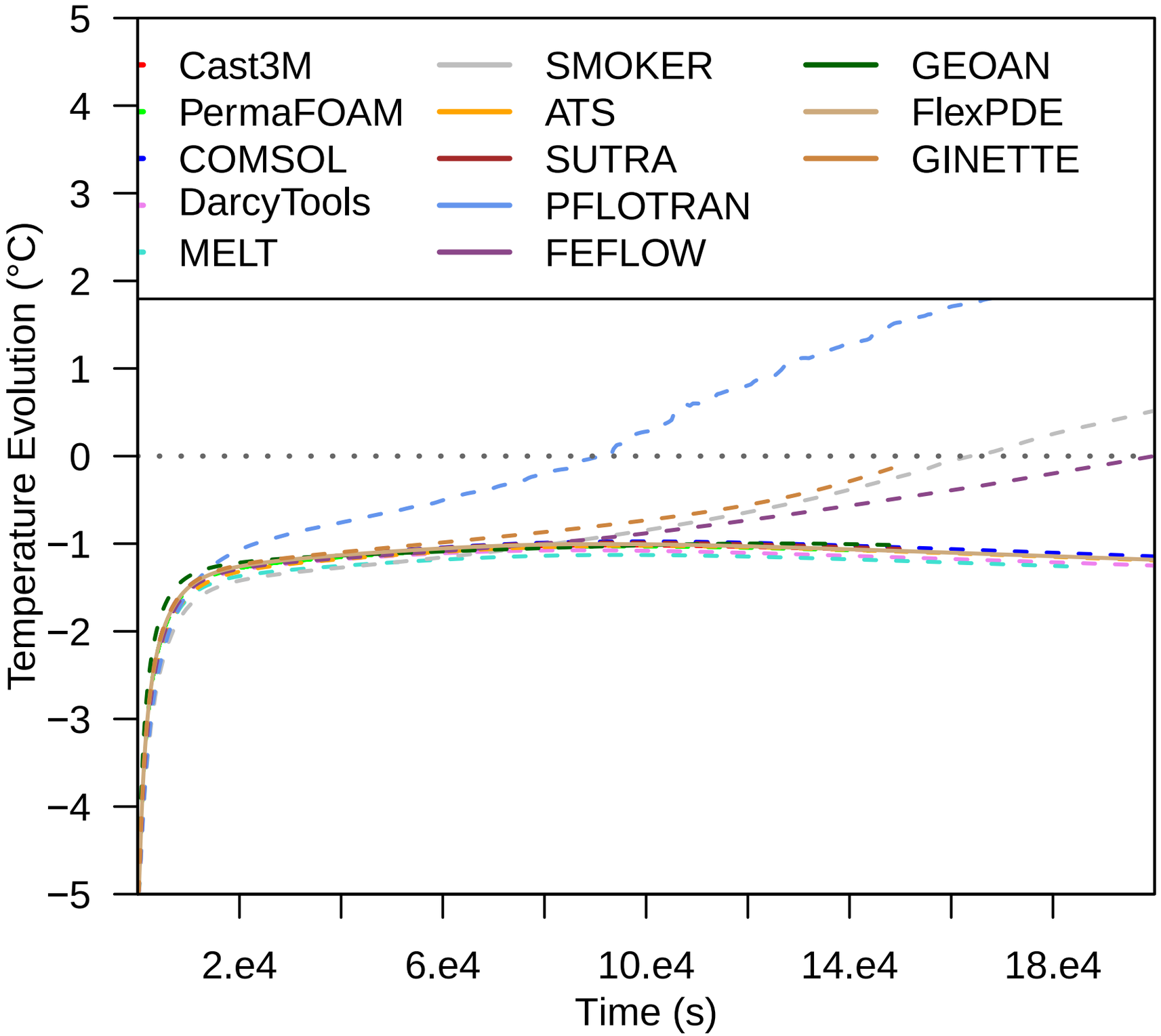

TH3: Temperature evolution at Pt1, Gradient 3 %
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)

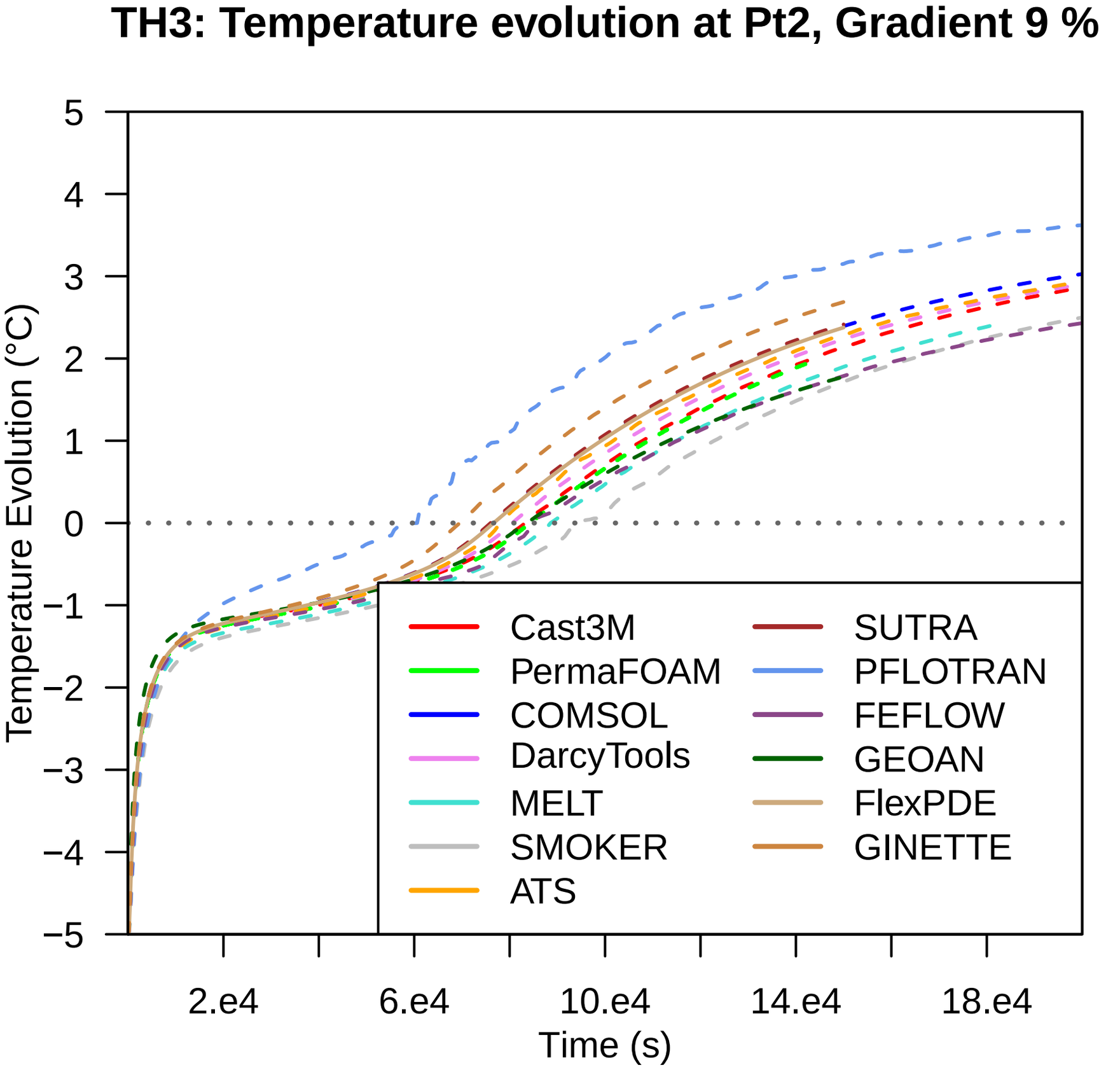

TH3: Temperature evolution at Pt1, Gradient 6 %
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)

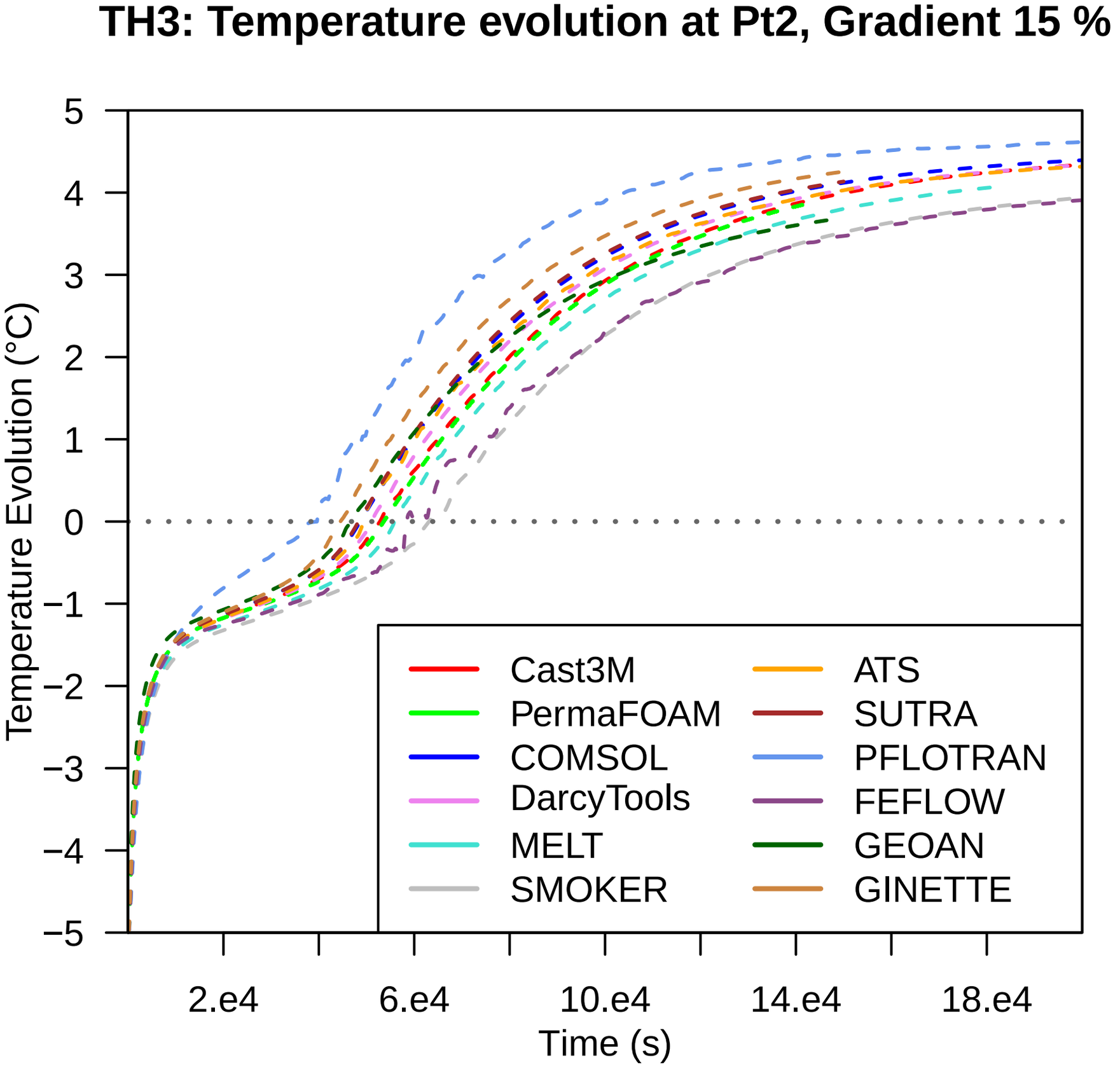

TH3: Temperature evolution at Pt1, Gradient 9 %
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)


TH3: Temperature evolution at Pt1, Gradient 15 %
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
GINETTE
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)


TH3: Temperature evolution at Pt2, Gradient 3 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)


TH3: Temperature evolution at Pt2, Gradient 6 %
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)


TH3: Temperature evolution at Pt2, Gradient 9 %
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
FlexPDE
GINETTE


TH3: Temperature evolution at Pt2, Gradient 15 %
Temperature Evolution (°C)
5
4
3
2
1
0
−1
−2
−3
−4
−5
2.e4
6.e4
10.e4
14.e4
18.e4
Time (s)
Cast3M
PermaFOAM
COMSOL
DarcyTools
MELT
SMOKER
ATS
SUTRA
PFLOTRAN
FEFLOW
GEOAN
GINETTE