1	Supporting Information for
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3	The 2024 Release of the Global Heat Flow Database (GHFDB): Quality Assessment, Metadata
4	Standards, and a Century of Geothermal Data
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21 Criterion for extracting data from the global HF database

22 Some Global Heat Flow Database data reflect local observations at extreme locations. For example, Wheat et al. (2004) 23 presented measurements directly on the Juan de Fuca hydrothermal system, where the maximum reaches up to 489,000 24 mW/m². Measurements at Ijen Volcano, Indonesia (Afandi et al., 2021) show a scatter of heat-flow values ranging from -6,120 to 109,480 mW/m². Including these extreme heat flow values in the global analysis can significantly affect 25 the overall statistics. To avoid this, we consider the data within -1,000 to 1,000 mW/m² and calculate the main statistical 26 27 parameters. The median value (64 mW/m²) best approximates the peak maximum of the heat flow distribution histogram (Fig.S1). Values for standard deviations σ , 2σ , and 3σ are 198.9, 303.5, and 408 mW/m², respectively. For 28 the global interpolation of the data, we will use the interval from 0 to 3σ (99.7% of all measurements) i.e., 0–408 29 mW/m², as it is more appropriate for the geothermal heat flow, excluding most extreme local surface effects. 30

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Fig. S1 Heat flow (q, mW/m²) distribution with major statistical parameters (median, mean, root mean square (RMS), and standard deviation σ). Considered data range: -1,000 to 1,000 mW/m².

We select only parent and unique data in the filtered dataset, ensuring that each measurement corresponds only to a single coordinate and heat flow value. Then, we divide the Earth's surface into a regular grid 0.5 by 0.5 degrees and calculate a median heat flow value for each grid cell containing data (Fig. S2). This approach reduces the impact of outliers providing more consistent data for further analysis.



40 Fig. S2 Distribution of median heat flow values averaged 0.5×0.5 degrees. The data is provided in files 41 IHFC_2024_GHFDB_05x05_median_3_sigma.csv and IHFC_2024_GHFDB_05x05_median_3_sigma.kml

Figure S3 represents the density of heat flow measurements within a specific geographic region. Each cell on the grid corresponds to a 0.5 by 0.5 degree latitude and longitude area. The color indicates the concentration of heat flow measurements within the particular grid cell. Thus, the figure shows regions where heat flow measurements are more abundant, sparse, or absent. According to Fig. 3, most dense measurements (up to 400 for the grid cell) are in North America and Europe.



48 Fig. S3 Density of the heat-flow measurements within each 0.5 by 0.5-degree grid cell. The data is included in files
49 IHFC_2024_GHFDB_05x05_median_3_sigma.csv and IHFC_2024_GHFDB_05x05_median_3_sigma.kml

50 References

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- 52 outcrop on a sedimented young ridge flank. Geochemistry, Geophysics, Geosystems, 5(12).
- 53 Afandi, A., Lusi, N., Catrawedarma, I. G. N. B., & Zaman, M. B. (2021, February). Identification of gradient
- 54 temperature and heat flow area of geothermal Ijen Volcano Indonesia. In IOP Conference Series: Materials Science
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57 Data formats description

58 Scattered data:

59 **IHFC_2024_GHFDB_unique.csv**: Comma Separated Values (csv) file containing unique heat flow values for every 60 measurement point

00	measurement por			
61	Columns:			
62		Q:	heat flow value in mW/m ²	
63		Name:	name of the measurement's site	
64		Lat:	latitude (-90°S:90°N)	
65		Lon:	longitude (-180°W:180°E)	
66		Reference:	referenced source	
67		ID:	unique child ID	
68				
69	IHFC_2024_GH	IFDB_uniqu	ue.kml: KML (Keyhole Markup Language) file containing unique heat flow values for	
70	every measureme	ent point.		
71	Descrip	tion:		
72		Latitude:	latitude (-90°S:90°N)	
73		Longitude:	longitude (-180°W:180°E)	
74		Heat flow:	heat flow value in mW/m ²	
75		Name:	name of the measurement's site	
76		Reference:	referenced source	
77		ID:	unique child ID	
78				
79				
80) IHFC_2024_GHFDB_filtered_3_sigma.csv: Comma Separated Values (csv) file containing heat flow value filtered			
81	with 3σ (standard	d deviations	from a mean) interval (derived from the data IHFC_2024_GHFDB_unique.xlsx).	
82				
83	Columns:			
84		Q:	heat flow value in mW/m^2	
85		Name:	name of the measurement's site	
86		Lat:	latitude (-90°S:90°N)	
87		Lon:	longitude (-180°W:180°E)	
88		Reference:	referenced source	
89		ID:	unique child ID	
90				

91	IHFC_2024_GHFDB_filtered_3_sigma.kml: KML (Keyhole Markup Language) file containing heat flow value			
92	filtered with 3σ (standard deviations from a mean) interval.			
93	Description:			
94		Latitude:	latitude (-90°S:90°N)	
95		Longitude:	longitude (-180°W:180°E)	
96		Heat flow:	heat flow value in mW/m ²	
97		Name:	name of the measurement's site	
98		Reference:	referenced source	
99		ID:	unique child ID	
100				
101	IHFC_2024_GH	HFDB_05x05	5_median_3_sigma.csv : Comma Separated Values (csv) file containing median heat	
102	flow value for ea	ich non-empt	y 0.5×0.5 degrees grid cell (derived from the data	
103	IHFC_2024_GH	FDB_filtered	1_3_sigma.xlsx).	
104				
105	Columns:			
106		Lat:	latitude $(-90^{\circ}S:90^{\circ}N)$	
107		Lon:	longitude (-180°W:180°E)	
108		Median_Q:	median value for the heat flow value in mW/m^2	
109		Number of		
110		measureme	nts: number of measurements in each grid cell	
111		Assessed(a)	(erage): number of assessed measurements in each grid cen	
112		IEDD 05-0	madian 2 signa lunde VML (Vaukala Markun Languaga) filo containing madian	
115	heat flow value f	IFDD_05X0:	ampty 0.5×0.5 dogroos grid coll	
114	Descrir	of each non-	empty 0.5×0.5 degrees grid cen.	
115	Descrip	Latituda:	latitude (00° S \cdot O $^{\circ}$ N)	
117		Langitude.	longitude (-180°W·180°F)	
118		Median O	median value for the heat flow value in mW/m^2	
119		Number of		
120	measurements; number of measurements in each grid cell			
121				
122				
123	Grid data:			
124				
125	IHFC_2024_GHFDB_05x05_WGS1984_Kriging.csv: Comma Separated Values (csv) file containing gridded heat			
126	flow data interpolated by Kriging at a resolution of 0.5×0.5 degrees. WGS 1984 projection			
127	Column	es:		
128		Lon:	longitude (-180°W:180°E)	

129	Lat:	latitude (-90°S:90°N)
130	Q:	heat flow value in mW/m ²
131		
132	IHFC_2024_GHFDB_05	x05_WGS1984_STD.csv: Comma Separated Values (csv) file containing gridded standard
133	deviation data for interpola	ated heat flow data. WGS 1984 projection
134	Columns:	
135	Lon:	longitude (-180°W:180°E)
136	Lat:	latitude (-90°S:90°N)
137	Q_std:	standard deviation for the interpolated data in mW/m ²
138		
139	IHFC_2024_GHFDB_O	tho_N.csv: Comma Separated Values (csv) file containing gridded heat flow data
140	interpolated by Kriging at	a resolution of 50×50 km. North Pole Orthographic projection
141	Columns:	
142	X:	X coordinate, m
143	Y:	Y coordinate, m
144	Q:	heat flow value in mW/m ²
145	Lon:	corresponding longitude (-180°W:180°E)
146	Lat:	corresponding latitude (28°N:90°N)
147		
148		
149	IHFC_2024_GHFDB_O	tho_N_STD.csv: Comma Separated Values (csv) file containing gridded standard
150	deviation data for interpola	ated heat flow data. North Pole Orthographic projection
151	Columns:	
152	X:	X coordinate, m
153	Y:	Y coordinate, m
154	Q_std:	standard deviation for the interpolated data in mW/m ²
155	Lon:	corresponding longitude (-180°W:180°E)
156	Lat:	corresponding latitude (28°N:90°N)
157		
158	IHFC_2024_GHFDB_O	tho_S.csv: Comma Separated Values (csv) file containing gridded heat flow data
159	interpolated by Kriging at	a resolution of 50×50 km. South Pole Orthographic projection
160	Columns:	
161	X:	X coordinate, m
162	Y:	Y coordinate, m
163	Q:	heat flow value in mW/m ²
164	Lon:	corresponding longitude (-180°W:180°E)
165	Lat:	corresponding latitude (-90°S:-28°S)
166	IHFC_2024_GHFDB_O	'tho_S_STD.csv: Comma Separated Values (csv) file containing gridded standard
167	deviation data for interpola	ated heat flow data. South Pole Orthographic projection
168	Columns:	

169	X:	X coordinate, m
170	Y:	Y coordinate, m
171	Q_std:	standard deviation for the interpolated data in mW/m^2
172	Lon:	corresponding longitude (-180°W:180°E)
173	Lat:	corresponding latitude (-90°S:-28°S)
174		