



wwPDB EM Validation Summary Report ⓘ

Oct 15, 2024 – 11:26 AM JST

PDB ID : 8XFE
EMDB ID : EMD-38302
Title : Cryo-EM structure of defence-associated sirtuin 2 (DSR2) H171A protein in complex with DSR anti-defence 1(DSAD1)
Authors : Li, Y.; Zhang, H.; Zheng, Q.; Wu, Y.; Li, S.
Deposited on : 2023-12-13
Resolution : 2.98 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

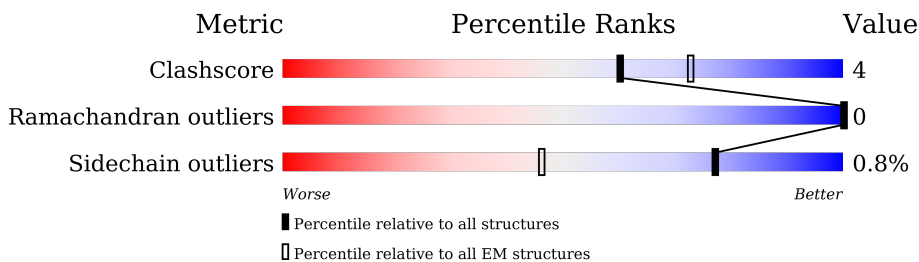
EMDB validation analysis : 0.0.1.dev113
MolProbity : 4.02b-467
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.98 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1005	
1	B	1005	
1	D	1005	
1	E	1005	
2	C	115	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 20339 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called DSR2(H171A).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	981	Total 7738	C 5034	N 1262	O 1413	S 29	0	0
1	B	984	Total 7529	C 4926	N 1229	O 1346	S 28	0	0
1	D	273	Total 2129	C 1384	N 348	O 390	S 7	0	0
1	E	272	Total 2049	C 1342	N 337	O 365	S 5	0	0

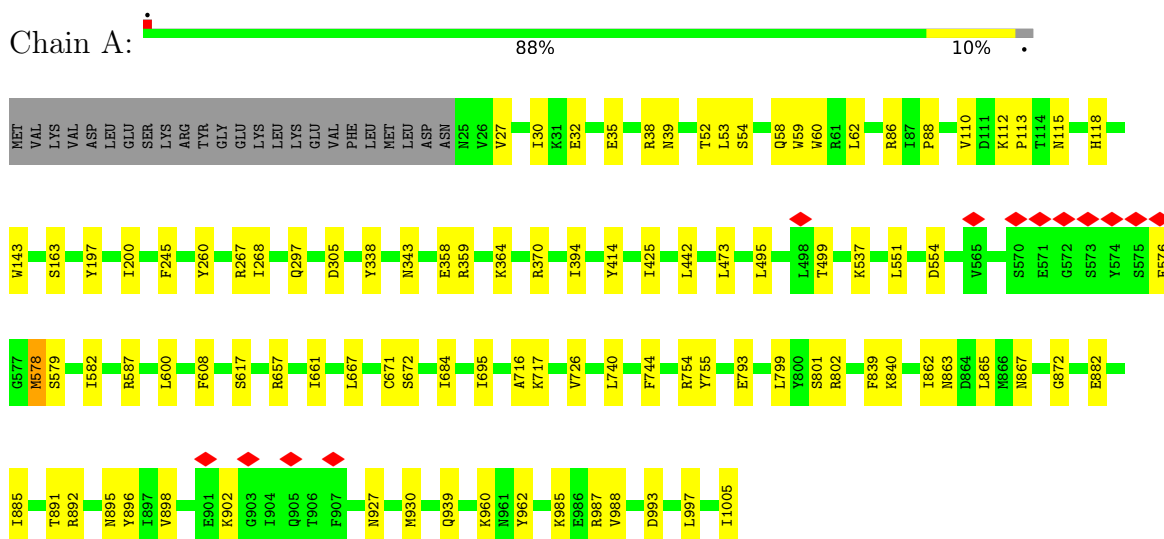
- Molecule 2 is a protein called DSAD1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	115	Total 894	C 583	N 147	O 161	S 3	0	0

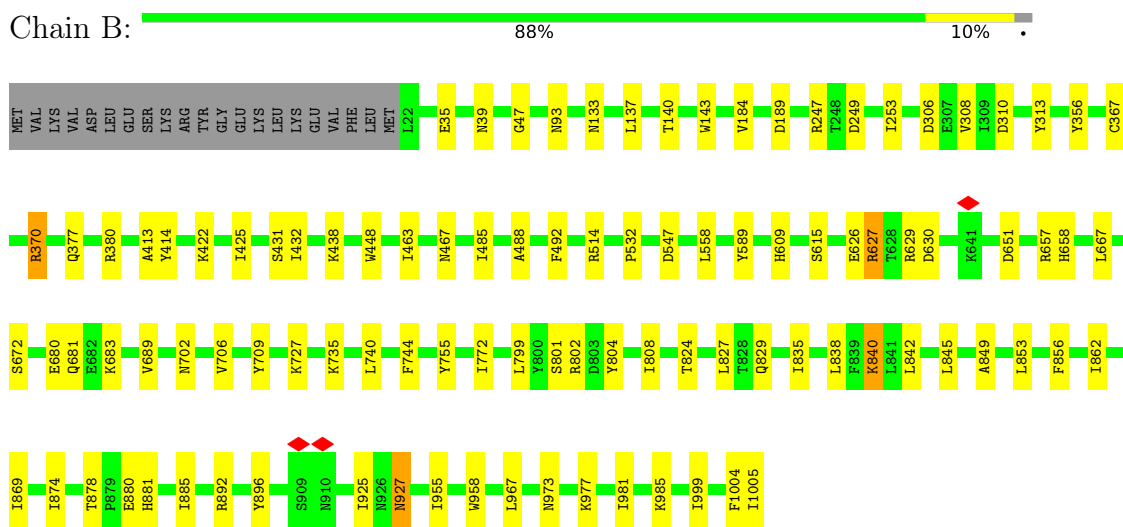
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: DSR2(H171A)



- Molecule 1: DSR2(H171A)



- Molecule 1: DSR2(H171A)

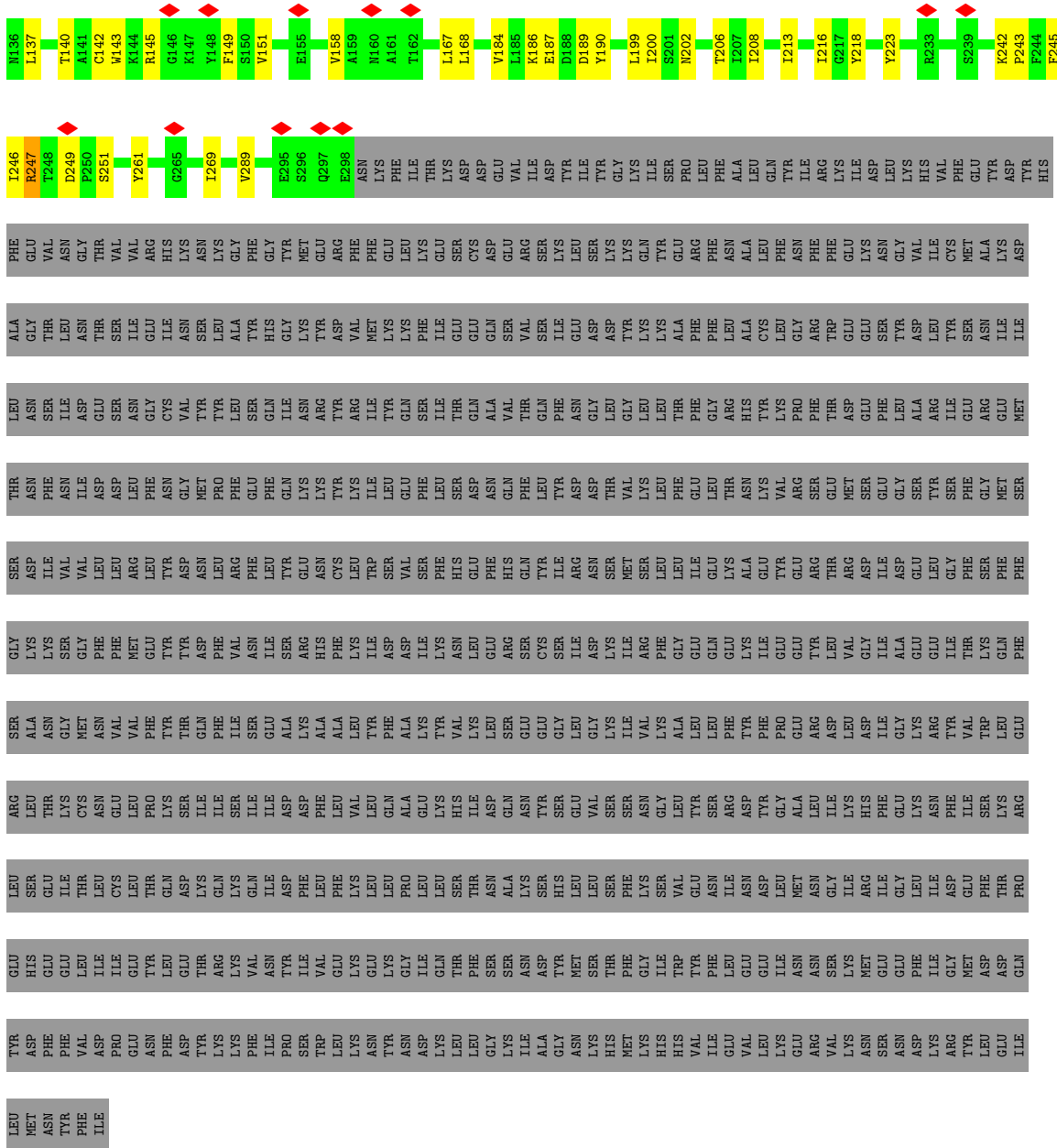


MET	VAL	LYS	VAL	ASP	LEU	GLU	SER	LYS	ARG	TYR	GLY	LYS	LEU	LEU	GLU	VAL	PHE	LEU	LEU	ASP	ASN	R25	C29	I30	R31	E32	R38	N39	G40	K41	L42	V43	G47	A48	G49	V50	S51	T52	D55	Q58	W59	W60	D64	Y79	S80	S81	M115	D119												
GLY	THR	VAL	ARG	GLU	HIS	LYS	ASN	LYS	GLY	PHE	GLY	TYR	MET	GLU	ARG	ASN	PHE	GLU	LEU	ILE	THR	SER	ASP	GLN	GLY	VAL	ILE	GLN	LYS	TYR	ALA	PRO	ARG	PHE	LEU	ALA	ALA	GLN	LYS	TYR	ASN	ASP	LEU	VAL	VAL	PHE	GLU	TRP	ARG	ILE	GLY	THR	ASP	ASN	ILE					
ASN	THR	ILE	GLU	ILE	ASN	SER	SER	LYS	ALA	HIS	GLY	LYS	TYR	ARG	VAL	VAL	LYS	PHE	ILE	GLU	THR	SER	ASP	GLN	VAL	THR	VAL	GLN	LYS	TYR	ALA	PHE	PHE	LEU	ALA	ALA	LYS	TYR	ASN	ASP	LEU	VAL	VAL	THR	ARG	ILE	GLY	THR	ASP	GLU	GLY	VAL	ILE	TYR	SER	ASN	ALA	ILE		
ASP	GLU	SER	ASN	CYS	VAL	TYR	TYR	TYR	LEU	GLN	ILE	ASN	ARG	TYR	ARG	ILE	TYR	GLN	SER	PHE	ILE	THR	GLU	ALA	VAL	THR	GLN	PHE	LEU	LYS	TYR	ALA	THR	PHE	GLY	ARG	HIS	LYS	TYR	VAL	VAL	THR	LYS	ARG	PHE	THR	ASP	GLU	GLY	THR	ASP	GLU	GLY	THR	ASP	ASN	VAL			
ILE	ASP	ASP	LEU	PHE	GLU	TYR	ASP	MET	PRO	PHE	GLU	LYS	GLN	ILE	TYR	ARG	ASN	GLY	TYR	PHE	ILE	LEU	SER	GLN	PHE	THR	VAL	LYS	TYR	ALA	THR	VAL	VAL	ARG	THR	GLY	THR	ASN	LYS	ALA	ALA	GLY	TYR	VAL	VAL	ARG	GLY	THR	ASP	MET	GLY	GLY	TYR	SER	THR	VAL				
VAL	LEU	ARG	LEU	GLU	TYR	ASN	ASP	GLY	PRO	PHE	GLU	TYR	ASN	GLY	TYR	ARG	ASN	GLY	TYR	PHE	ILE	LEU	SER	VAL	HIS	GLN	PHE	LEU	LYS	TYR	ALA	THR	THR	GLY	GLN	GLY	LYS	ALA	ALA	GLY	TYR	VAL	VAL	ARG	THR	VAL	VAL	ASP	GLY	GLY	TYR	GLY	GLY	SER						
GLY	PHE	PHE	MET	GLU	TYR	TYR	ASP	TYR	PHE	VAL	ASN	ARG	HIS	ILE	LYS	ALA	HIS	ASP	ILE	ILE	LYS	VAL	ASN	ARG	GLY	SER	GLN	GLY	LEU	ALA	GLY	GLY	GLY	GLN	GLY	LYS	TYR	VAL	PRO	PHE	LEU	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL	VAL					
MET	ASN	VAL	VAL	PHE	TYR	THR	GLN	PHE	ILE	PHE	ILE	ALA	HIS	LYS	ALA	ALA	TYR	PHE	ALA	LYS	VAL	ALA	GLY	SER	GLU	GLU	GLY	LEU	LEU	ALA	PRO	PHE	PRO	PHE	LEU	LEU	ARG	ASP	ASP	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU					
CYS	ASN	GLU	LEU	PRO	LYS	SER	ILE	ILE	SER	ILE	ASP	PHE	LYS	VAL	VAL	GLN	ALA	GLU	ALA	GLU	LYS	HIS	ASN	GLN	ASN	TYR	SER	GLY	LEU	VAL	TYR	TYR	ALA	ALA	ALA	ILE	ILE	ILE	LYS	ASN	ASP	ASP	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU	LEU			
THR	LEU	CYS	THR	THR	GLN	LYS	ASN	GLN	PHE	LEU	ASP	PHE	LEU	LEU	LEU	PRO	ALA	SER	ALA	LYS	VAL	THR	ASN	ALA	LYS	SER	LEU	LYS	VAL	VAL	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN	ASN		
LEU	ILE	ILE	GLU	TYR	THR	LEU	THR	THR	VAL	VAL	ILE	VAL	VAL	GLY	GLY	ILE	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	THR	
VAL	ASP	PRO	GLU	ASN	PHE	ASP	TYR	LYS	PHE	PRO	SER	TRP	LYS	ASN	TYR	ASN	ASP	ASN	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP	ASP
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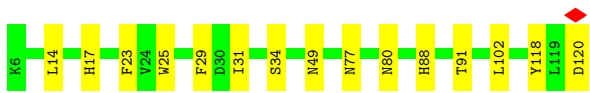
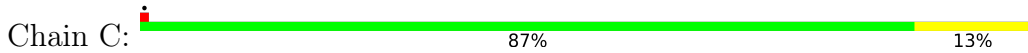
• Molecule 1: DSR2(H171A)



MET	VAL	LYS	VAL	ASP	LEU	GLU	SER	LYS	ARG	TYR	GLY	LYS	LEU	LEU	GLU	VAL	PHE	LEU	LEU	ASP	ASN	ASN	VAL	V27	E28	C29	I30	I33	T34	E35	R38	N39	V43	F44	Y46	K76	Y84	I87	I90	K112	I121	P126	A127	H128	D135
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● Molecule 2: DSAD1



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	269385	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI F30	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.298	Depositor
Minimum map value	-0.131	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.008	Depositor
Recommended contour level	0.03	Depositor
Map size (\AA)	292.5, 292.5, 292.5	wwPDB
Map dimensions	450, 450, 450	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.65, 0.65, 0.65	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.47	0/7923	0.57	0/10737
1	B	0.47	0/7715	0.58	0/10490
1	D	0.31	0/2183	0.50	0/2974
1	E	0.33	0/2103	0.53	0/2874
2	C	0.46	0/915	0.62	0/1244
All	All	0.44	0/20839	0.56	0/28319

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7738	0	7323	61	0
1	B	7529	0	6954	58	0
1	D	2129	0	2025	25	0
1	E	2049	0	1907	28	0
2	C	894	0	866	9	0
All	All	20339	0	19075	169	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

The worst 5 of 169 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:576:PHE:HA	1:A:582:ILE:HD11	1.49	0.95
1:A:343:ASN:HD21	1:A:578:MET:HG3	1.51	0.73
1:A:53:LEU:HB2	1:A:115:ASN:HD22	1.60	0.65
1:A:671:CYS:SG	1:A:672:SER:N	2.68	0.65
1:D:48:ALA:HA	1:D:133:ASN:HD21	1.62	0.65

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	979/1005 (97%)	917 (94%)	62 (6%)	0	100	100
1	B	982/1005 (98%)	929 (95%)	53 (5%)	0	100	100
1	D	271/1005 (27%)	261 (96%)	10 (4%)	0	100	100
1	E	270/1005 (27%)	252 (93%)	18 (7%)	0	100	100
2	C	113/115 (98%)	102 (90%)	11 (10%)	0	100	100
All	All	2615/4135 (63%)	2461 (94%)	154 (6%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	790/922 (86%)	788 (100%)	2 (0%)	91	96

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	726/922 (79%)	715 (98%)	11 (2%)	60	82
1	D	218/922 (24%)	218 (100%)	0	100	100
1	E	196/922 (21%)	193 (98%)	3 (2%)	60	82
2	C	97/108 (90%)	97 (100%)	0	100	100
All	All	2027/3796 (53%)	2011 (99%)	16 (1%)	77	90

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	145	ARG
1	E	38	ARG
1	B	667	LEU
1	B	973	ASN
1	B	627	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 25 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	614	ASN
1	B	797	ASN
1	E	236	GLN
1	B	702	ASN
1	B	881	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

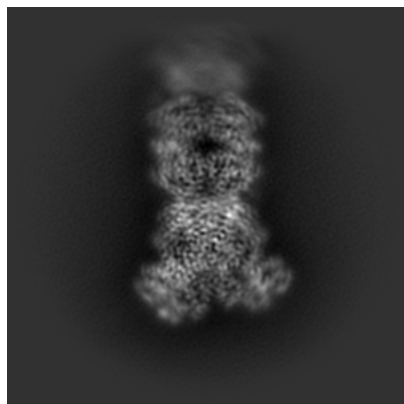
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-38302. These allow visual inspection of the internal detail of the map and identification of artifacts.

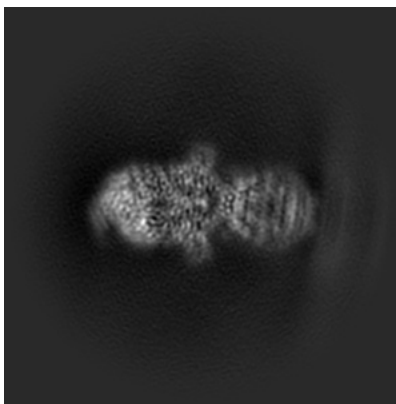
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

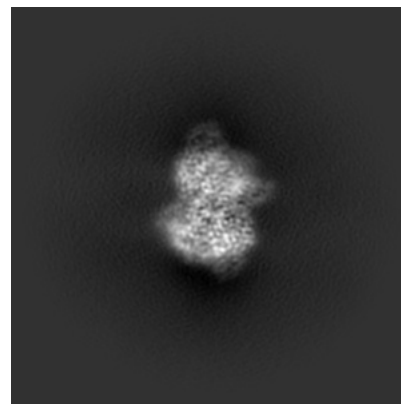
6.1.1 Primary map



X

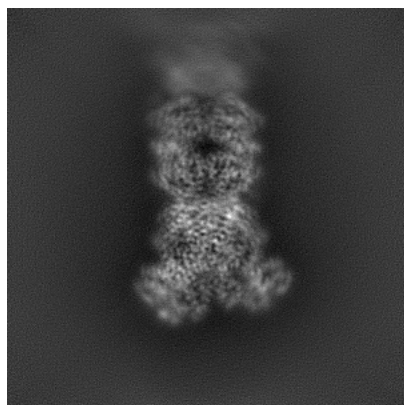


Y

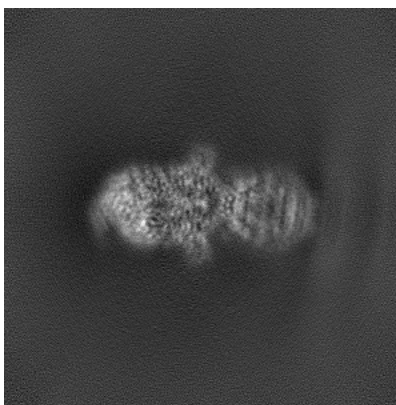


Z

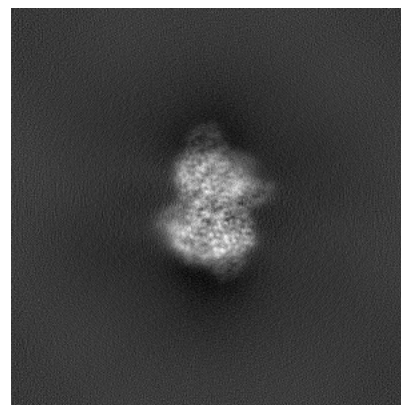
6.1.2 Raw map



X



Y

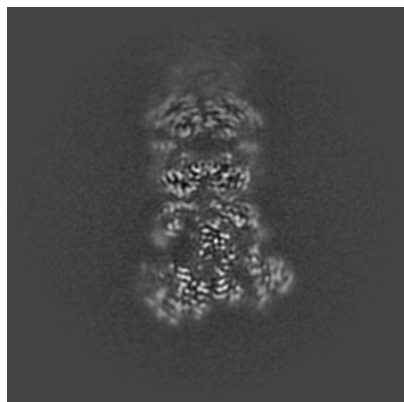


Z

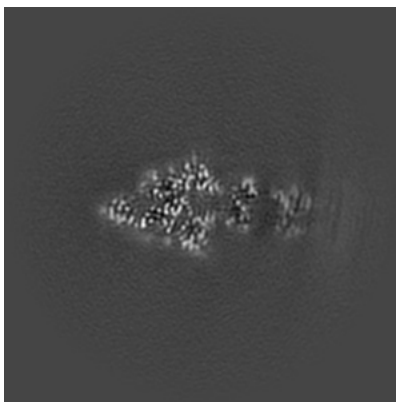
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

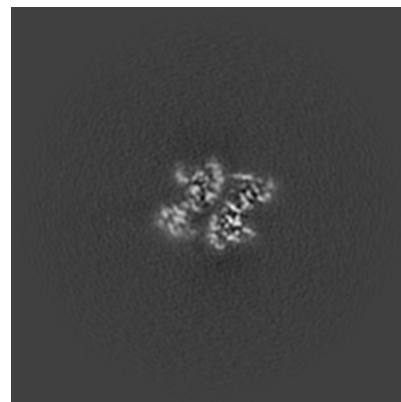
6.2.1 Primary map



X Index: 225

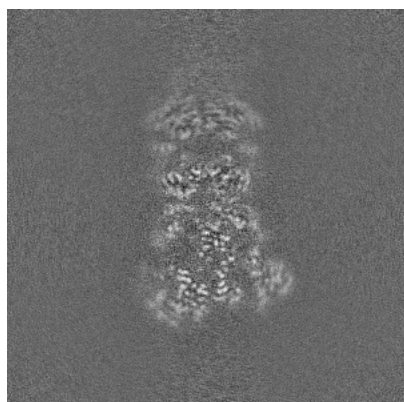


Y Index: 225

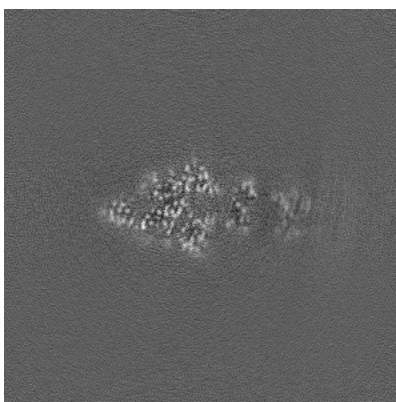


Z Index: 225

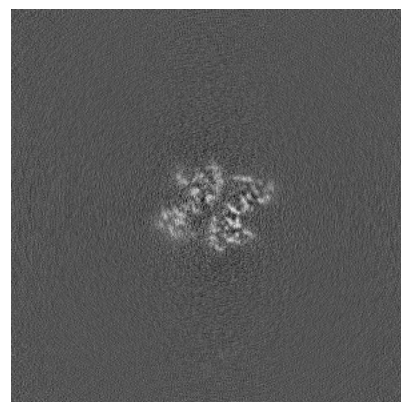
6.2.2 Raw map



X Index: 225



Y Index: 225

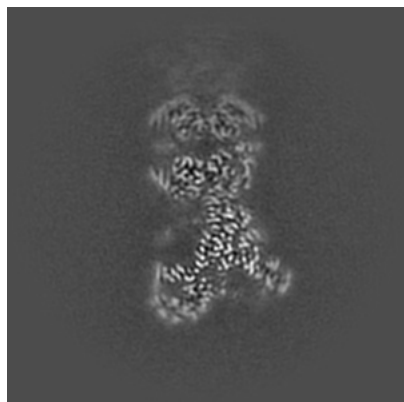


Z Index: 225

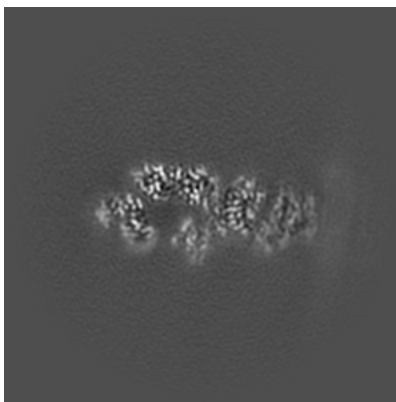
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

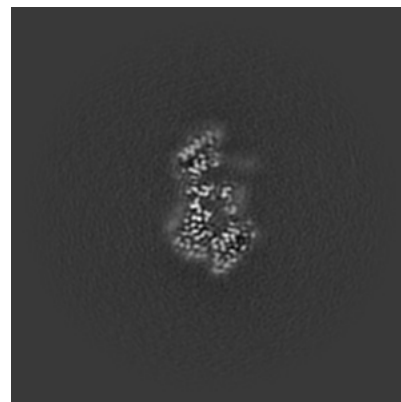
6.3.1 Primary map



X Index: 216

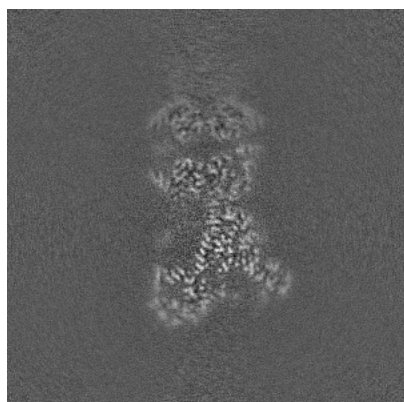


Y Index: 200

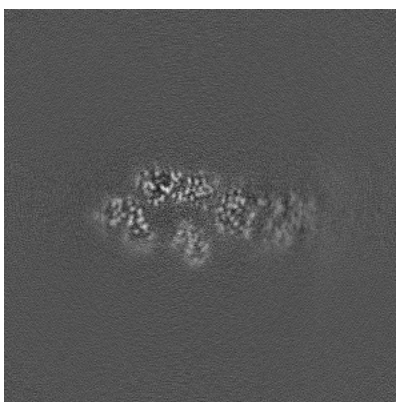


Z Index: 156

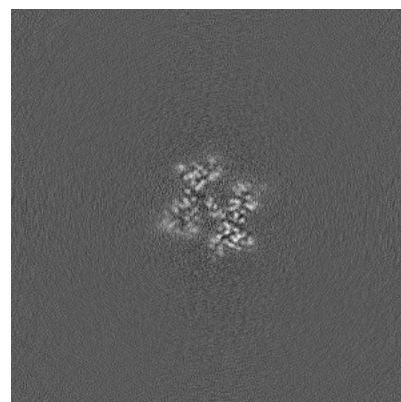
6.3.2 Raw map



X Index: 217



Y Index: 204

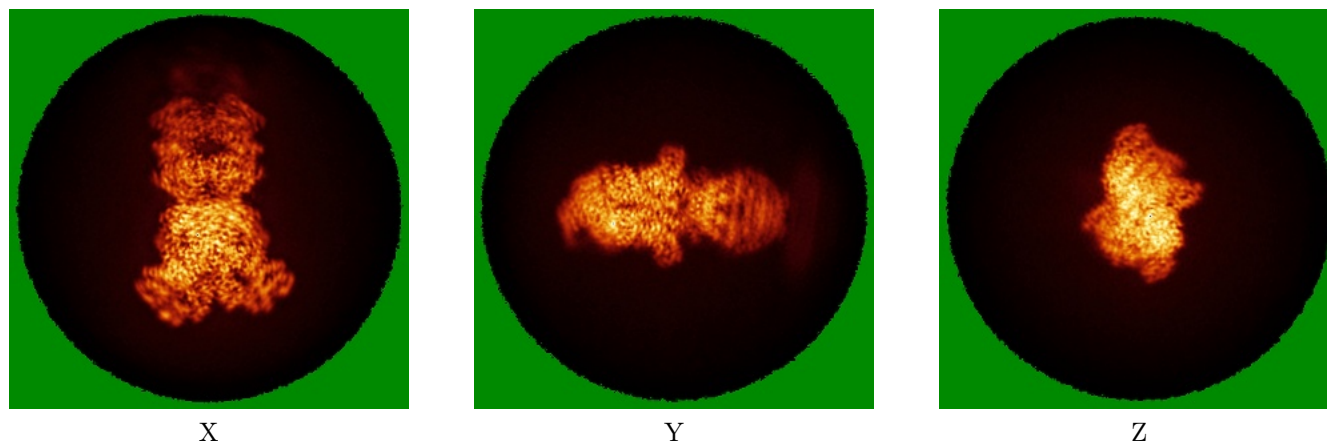


Z Index: 205

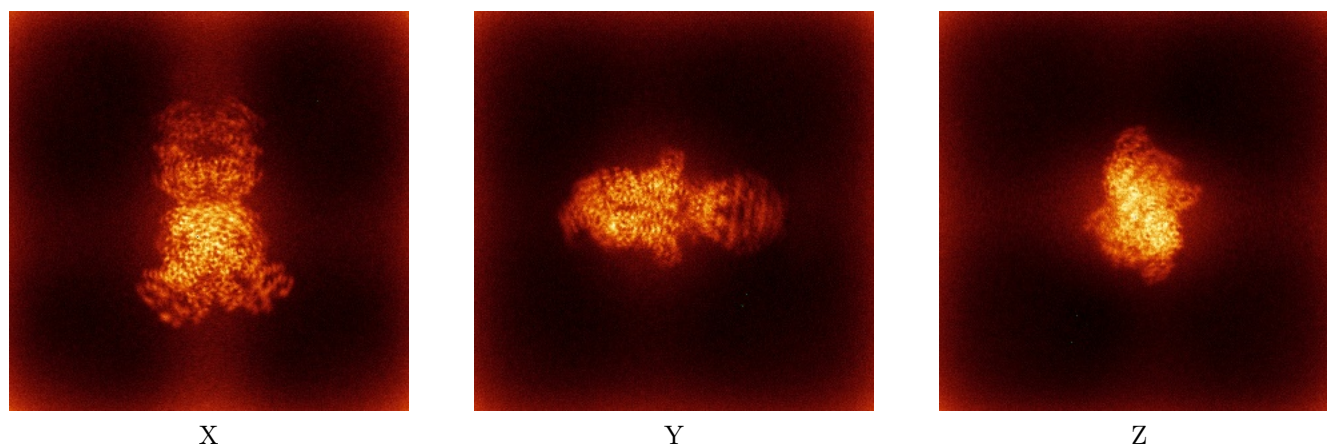
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

6.4.1 Primary map



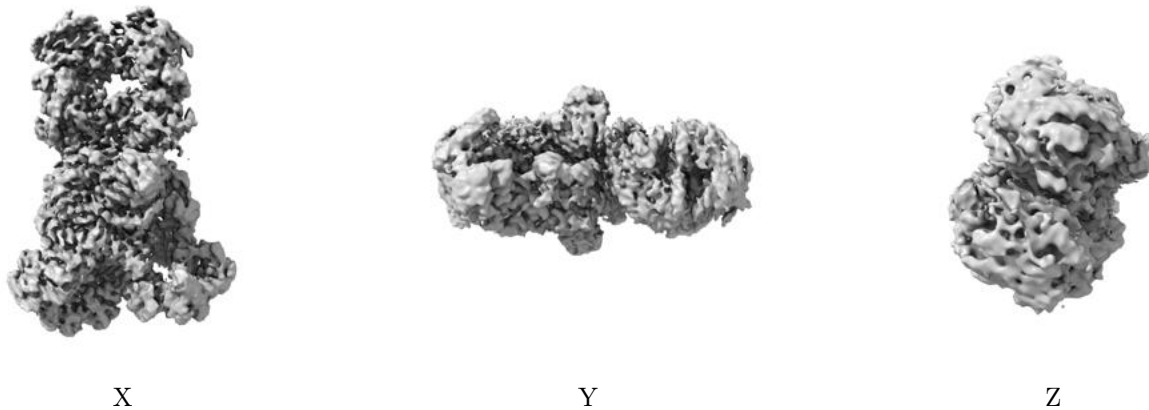
6.4.2 Raw map



The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

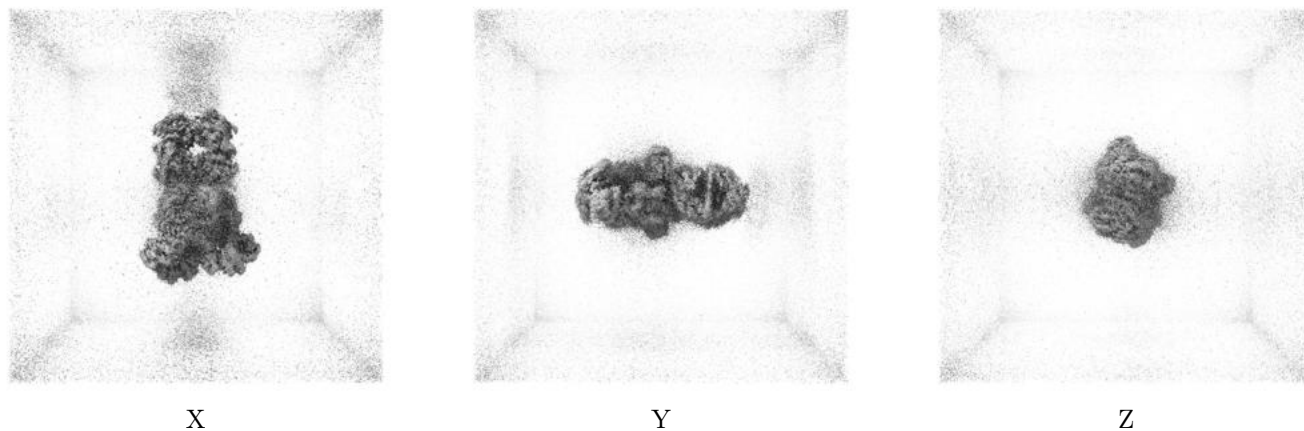
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

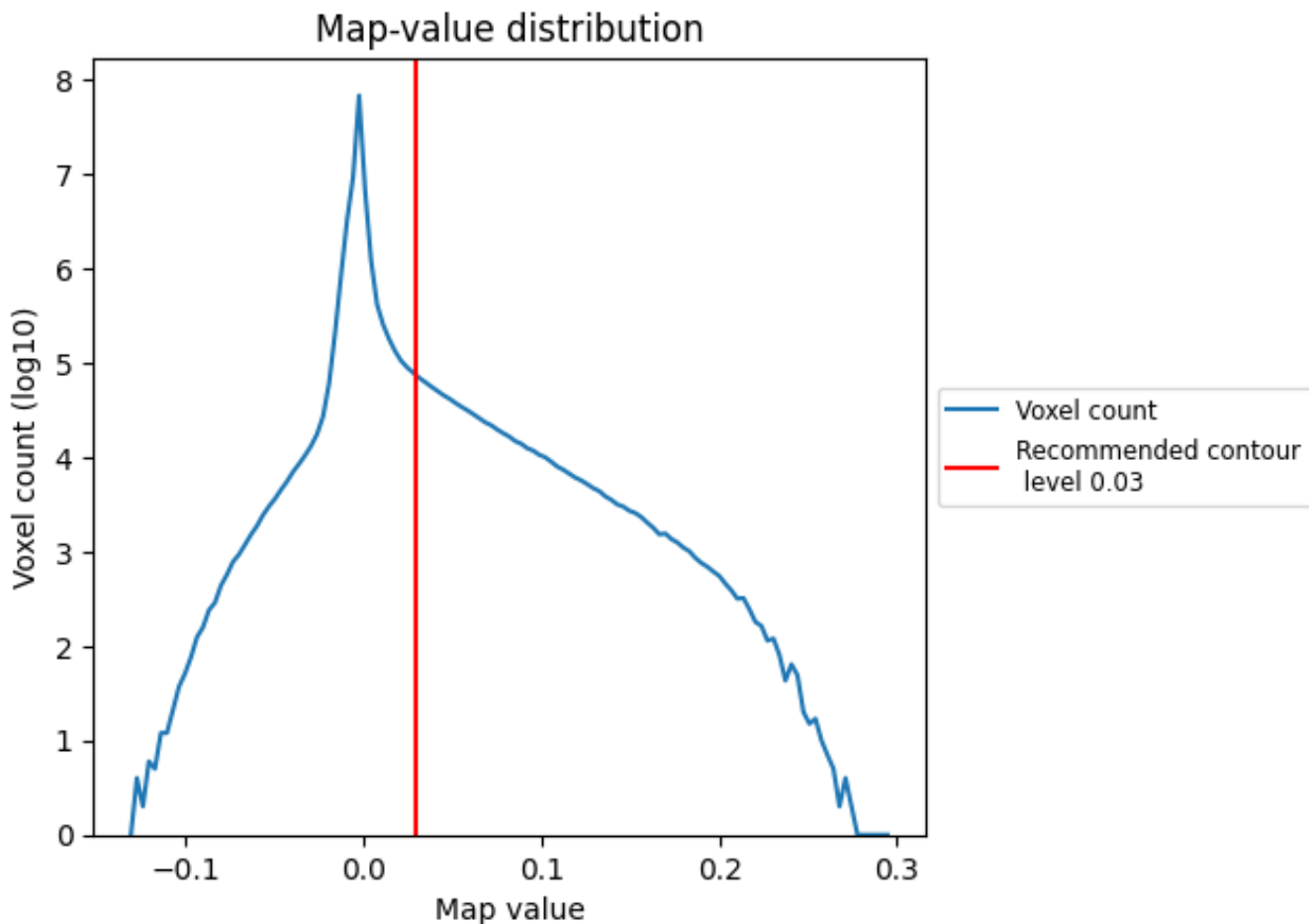
6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

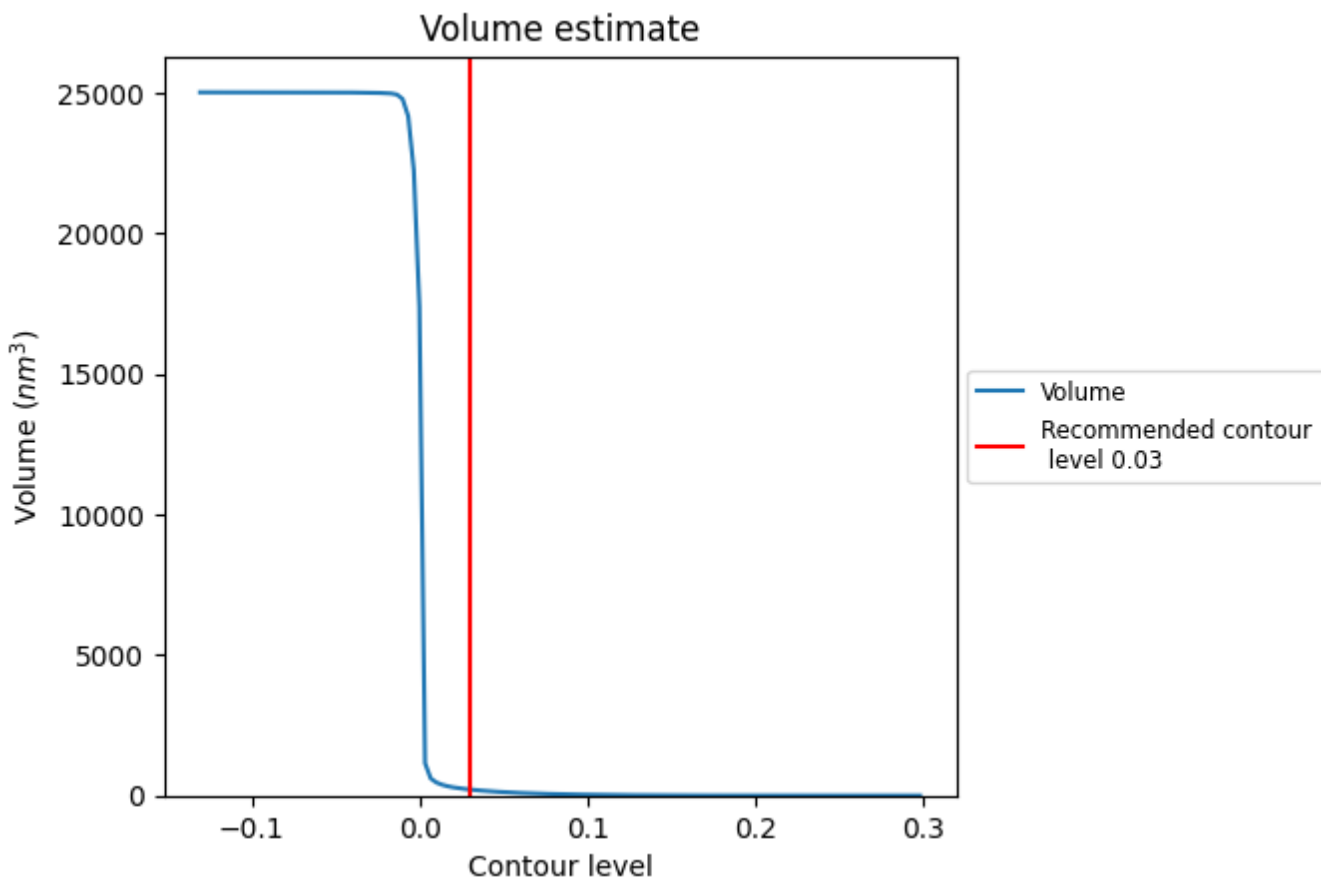
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

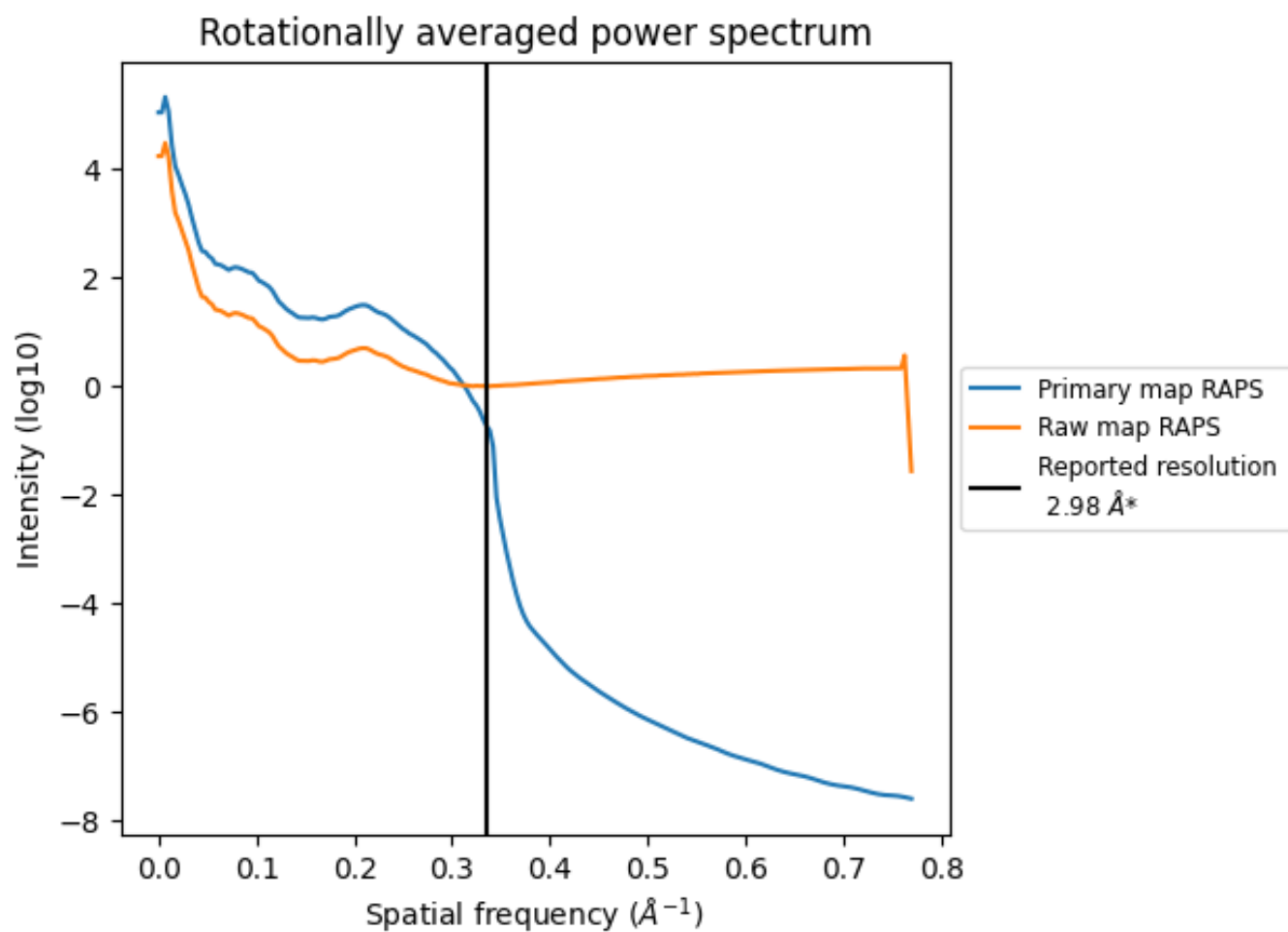
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 214 nm³; this corresponds to an approximate mass of 194 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum [i](#)

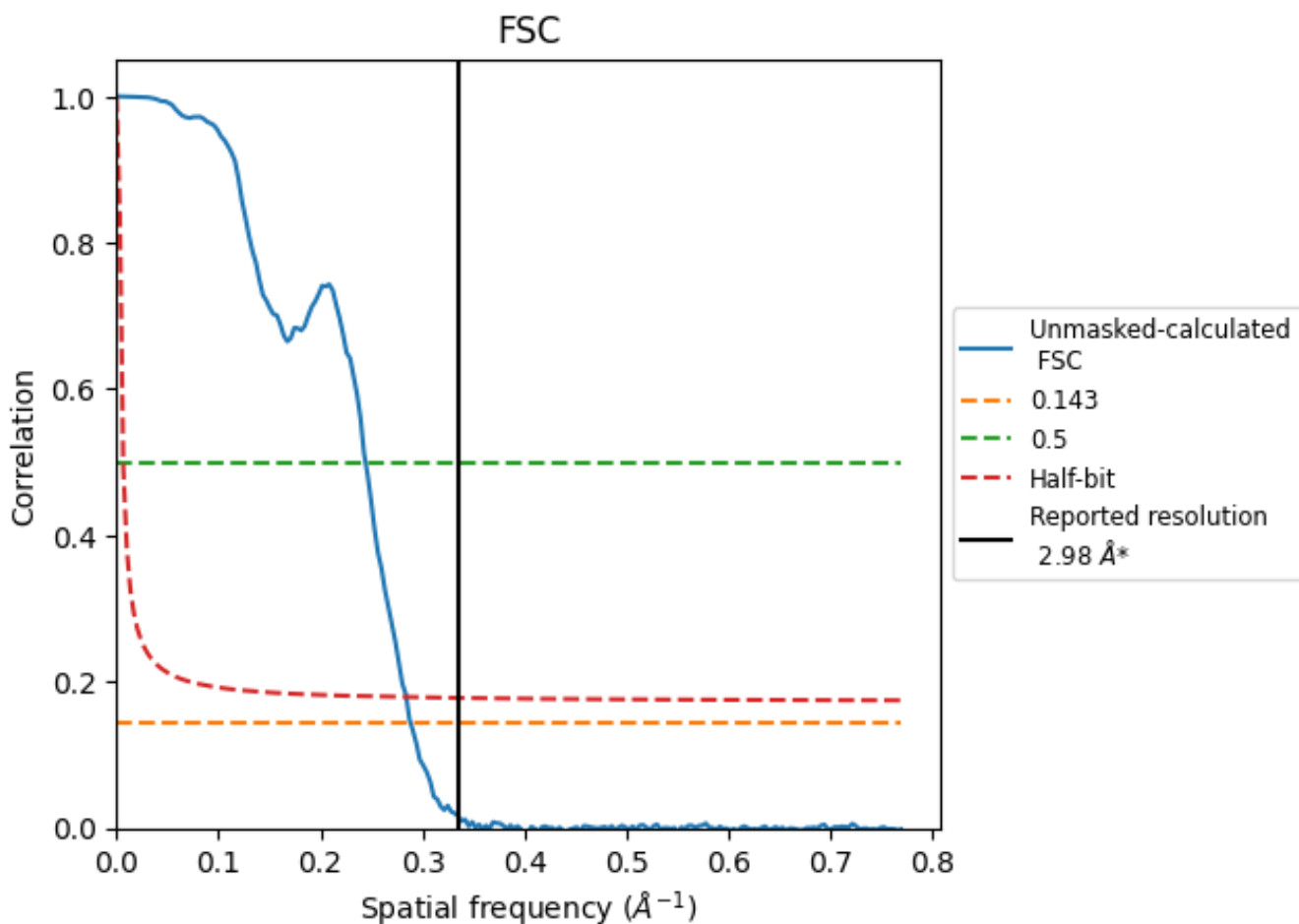


*Reported resolution corresponds to spatial frequency of 0.336 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.336 Å⁻¹

8.2 Resolution estimates [i](#)

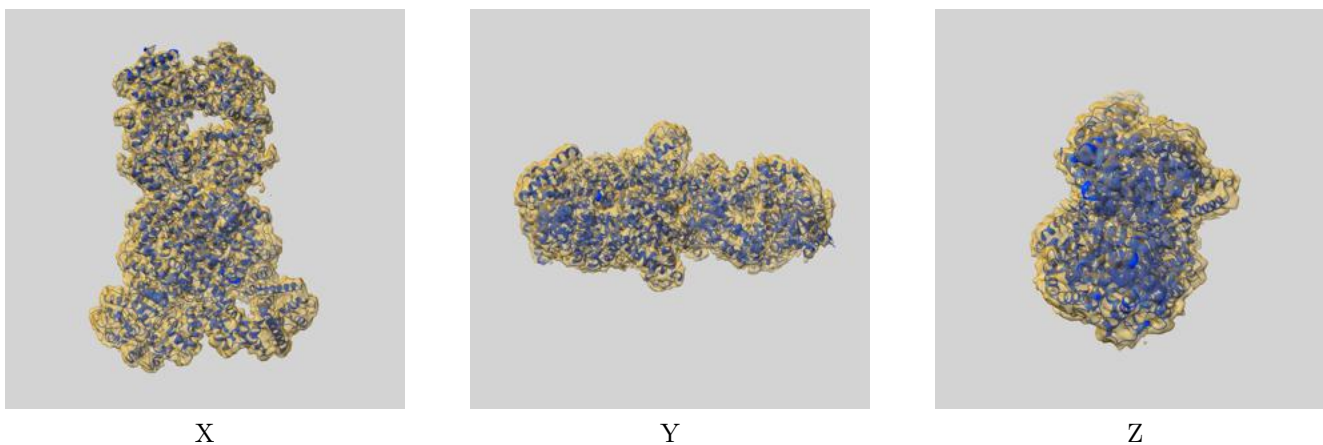
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.98	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.47	4.10	3.52

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.47 differs from the reported value 2.98 by more than 10 %

9 Map-model fit [i](#)

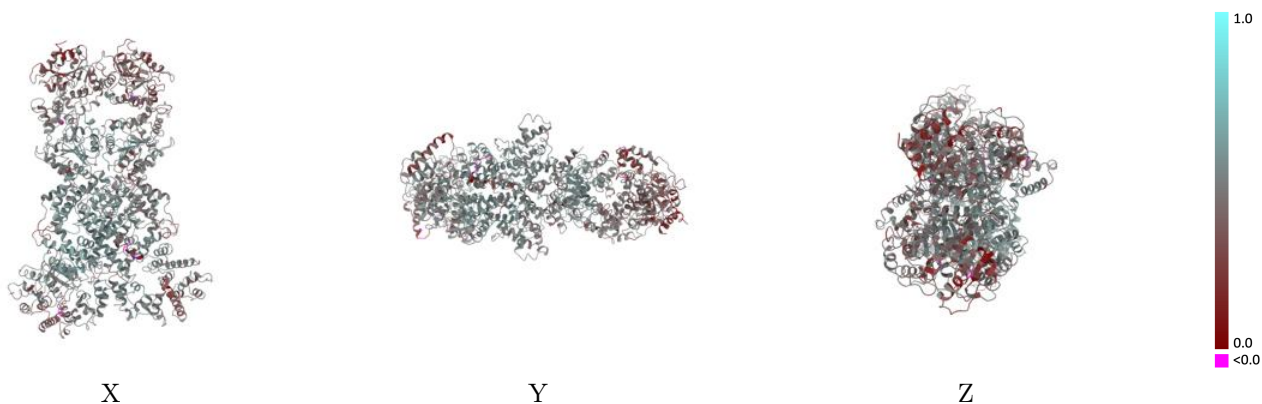
This section contains information regarding the fit between EMDB map EMD-38302 and PDB model 8XFE. Per-residue inclusion information can be found in section 3 on page 4.

9.1 Map-model overlay [i](#)



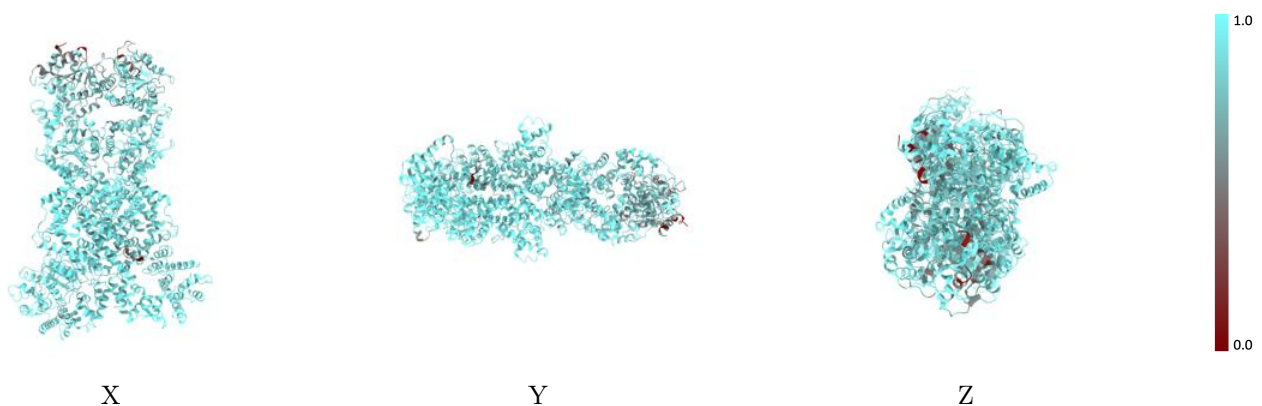
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



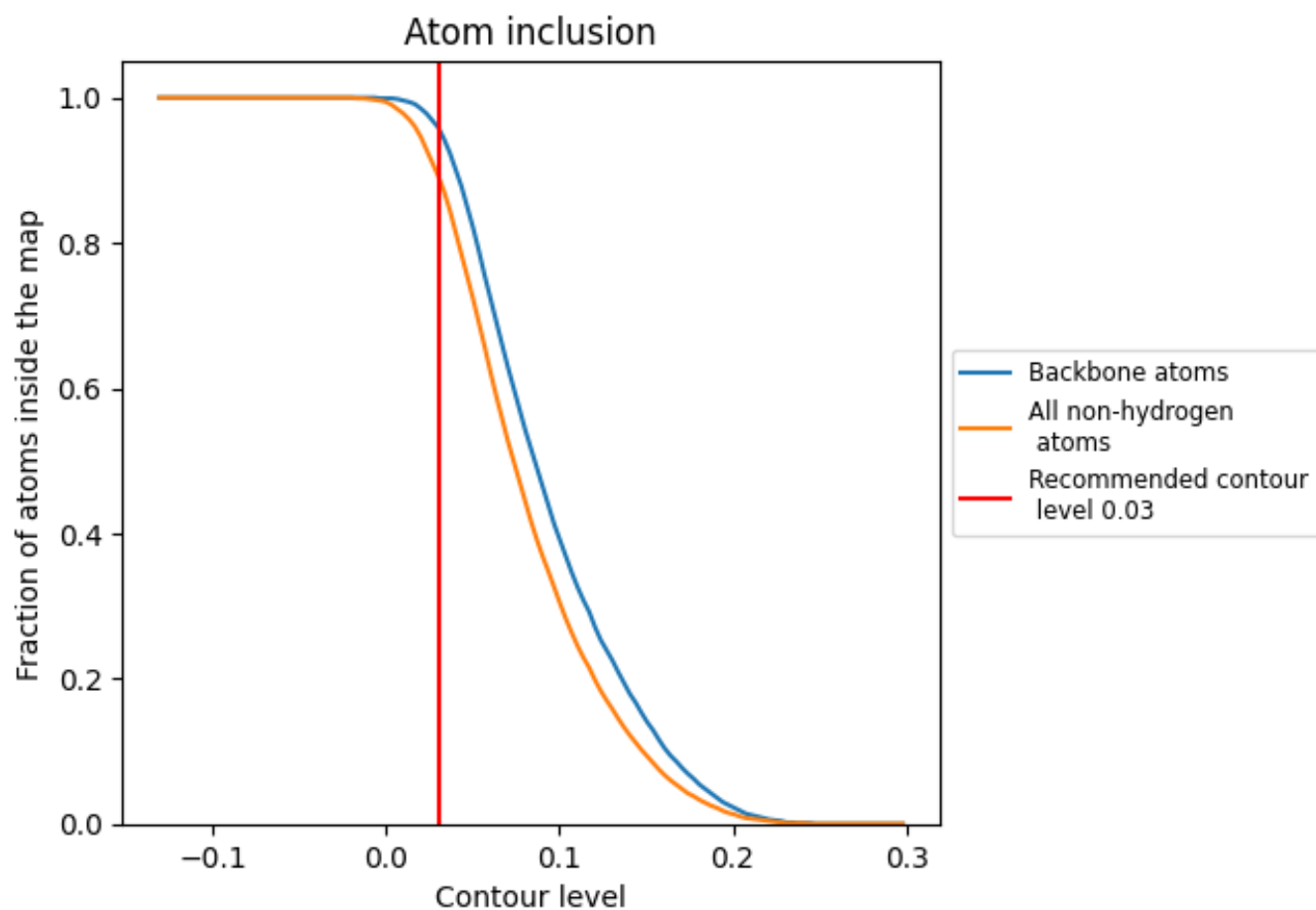
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.03).













9.4 Atom inclusion [i](#)



At the recommended contour level, 96% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8920	 0.4650
A	 0.9230	 0.4890
B	 0.9440	 0.4960
C	 0.9050	 0.4570
D	 0.7400	 0.3790
E	 0.7380	 0.3500

