W O R L D W I D E
wwPDB
P R O T E I N D A T A B A N K

Full wwPDB EM Validation Report ⓘ

May 14, 2023 – 12:18 AM JST

PDB ID	:	7XJY
EMDB ID	:	EMD-33237
Title	:	Cryo-EM structure of Oryza sativa plastid glycyl-tRNA synthetase (apo form)
Authors	:	Yu, Z.; Wu, Z.; Li, Y.; Lu, G.; Lin, J.
Deposited on	:	2022-04-19
Resolution	:	3.60 Å(reported)

This is a Full wwPDB EM Validation 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.dev50
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.32.2

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 3.60 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	Percentile Ranks	Value
Clashscore		10
Ramachandran outliers		0.3%
Sidechain outliers		7.0%

Worse   *Better*

▮ Percentile relative to all structures
❑ Percentile relative to all EM structures
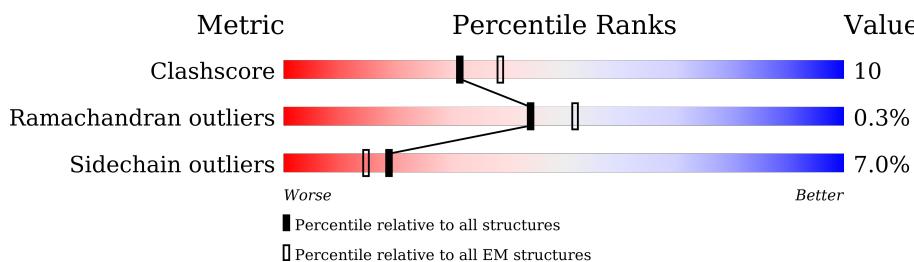
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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 <=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	1045	16% — 53% · 19% · 27%
1	B	1045	15% — 53% · 19% · 27%

WORLDWIDE
wwPDB
PROTEIN DATA BANK
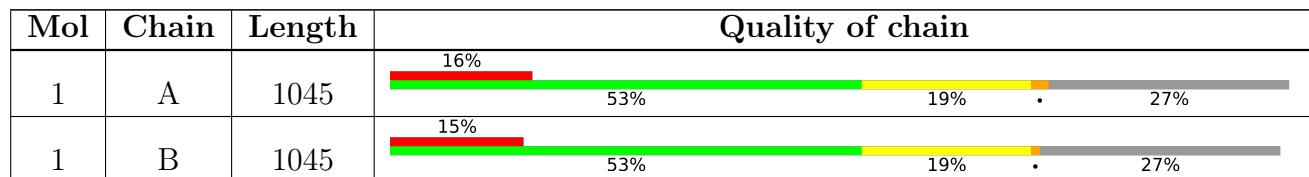
2 Entry composition ⓘ

There is only 1 type of molecule in this entry. The entry contains 12070 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 Glycine–tRNA ligase.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	763	Total 6034	C 3856	N 1029	O 1125	S 24	0	0
1	B	763	Total 6036	C 3857	N 1032	O 1123	S 24	0	0

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-18	HIS	-	expression tag	UNP Q0DFB6
A	-17	HIS	-	expression tag	UNP Q0DFB6
A	-16	HIS	-	expression tag	UNP Q0DFB6
A	-15	HIS	-	expression tag	UNP Q0DFB6
A	-14	HIS	-	expression tag	UNP Q0DFB6
A	-13	HIS	-	expression tag	UNP Q0DFB6
A	-12	HIS	-	expression tag	UNP Q0DFB6
A	-11	HIS	-	expression tag	UNP Q0DFB6
A	-10	GLY	-	expression tag	UNP Q0DFB6
A	-9	SER	-	expression tag	UNP Q0DFB6
A	-8	SER	-	expression tag	UNP Q0DFB6
A	-7	LEU	-	expression tag	UNP Q0DFB6
A	-6	GLU	-	expression tag	UNP Q0DFB6
A	-5	VAL	-	expression tag	UNP Q0DFB6
A	-4	LEU	-	expression tag	UNP Q0DFB6
A	-3	PHE	-	expression tag	UNP Q0DFB6
A	-2	GLN	-	expression tag	UNP Q0DFB6
A	-1	GLY	-	expression tag	UNP Q0DFB6
A	0	PRO	-	expression tag	UNP Q0DFB6
A	439	PRO	LEU	conflict	UNP Q0DFB6
A	925	THR	ALA	conflict	UNP Q0DFB6
A	998	LYS	ARG	conflict	UNP Q0DFB6
B	-18	HIS	-	expression tag	UNP Q0DFB6
B	-17	HIS	-	expression tag	UNP Q0DFB6
B	-16	HIS	-	expression tag	UNP Q0DFB6
B	-15	HIS	-	expression tag	UNP Q0DFB6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-14	HIS	-	expression tag	UNP Q0DFB6
B	-13	HIS	-	expression tag	UNP Q0DFB6
B	-12	HIS	-	expression tag	UNP Q0DFB6
B	-11	HIS	-	expression tag	UNP Q0DFB6
B	-10	GLY	-	expression tag	UNP Q0DFB6
B	-9	SER	-	expression tag	UNP Q0DFB6
B	-8	SER	-	expression tag	UNP Q0DFB6
B	-7	LEU	-	expression tag	UNP Q0DFB6
B	-6	GLU	-	expression tag	UNP Q0DFB6
B	-5	VAL	-	expression tag	UNP Q0DFB6
B	-4	LEU	-	expression tag	UNP Q0DFB6
B	-3	PHE	-	expression tag	UNP Q0DFB6
B	-2	GLN	-	expression tag	UNP Q0DFB6
B	-1	GLY	-	expression tag	UNP Q0DFB6
B	0	PRO	-	expression tag	UNP Q0DFB6
B	439	PRO	LEU	conflict	UNP Q0DFB6
B	925	THR	ALA	conflict	UNP Q0DFB6
B	998	LYS	ARG	conflict	UNP Q0DFB6

3 Residue-property plots ⓘ

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: Glycine–tRNA ligase

• Molecule 1: Glycine–tRNA ligase

Chain B:

15%

53%   19%   •   27%

C808 Q809 P810 S811 S812 T813 N814 D815 P816 F817 G818 L819 R820 R821 I822 S823 Y824 G825 L826 V827 Q828 I829 L830 V831 E832 N833 K834 K835 N836 F837 D838 L839 T840 K841 A842 L843 T844 L845 V846 A847 E848 E849 Q850 P851 I852 T853 I854 D855 S856 G857 V858 I859 D860 E861 V862 V863 Q864 F865 V866 T867

R868 R869 L870 E871 Q872 L873 L874 VAL ASP GLU GLY ILE ASN CYS GLU ILE VAL ARG SER VAL LEU ILE GLU ARG ALA ASN CYS PRO TYR LEU ALA SER GLN THR ALA ILE GLU MET GLU ALA PHE SER ARG THR GLU ASP PHE PRO LYS ILE VAL GLU ALA TYR SER ARG PRO THR ARG ILE

ILE ARG GLY LYS GLU ILE GLY SER ALA LEU GLU VAL ASP ALA SER VAL PHE GLU LYS ASP GLU GLU ARG ALA LEU LEU TRP SER ALA TYR LEU GLU VAL ALA ASP LYS ILE HIS PRO GLY VAL ASP ILE LYS ALA PHE ALA ASP ALA SER LEU GLU LEU GLU GLN PRO LEU GLU ASP PHE PHE

THR ASN VAL PHE VAL MET ALA GLU ASP GLU LYS VAL ARG ASN ARG LEU ALA LEU LEU THR LYS VAL ALA SER LEU PRO LYS GLY ILE ALA ASP LEU SER VAL LEU PRO GLY PHE

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	18283	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	1.25	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	4.991	Depositor
Minimum map value	-2.897	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.133	Depositor
Recommended contour level	0.7	Depositor
Map size (Å)	422.40002, 422.40002, 422.40002	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1, 1.1, 1.1	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	0.40	0/6159	0.58	0/8351
1	B	0.40	0/6161	0.56	0/8353
All	All	0.40	0/12320	0.57	0/16704

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	6034	0	6038	119	0
1	B	6036	0	6045	114	0
All	All	12070	0	12083	231	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 10.

All (231) 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:616:VAL:HG22	1:A:744:PHE:CE1	1.85	1.10
1:B:670:TYR:HA	1:B:740:ILE:HD11	1.65	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:803:LEU:HB2	1:B:819:LEU:HD21	1.68	0.76
1:A:30:LEU:O	1:A:198:GLN:NE2	2.20	0.73
1:B:833:ASN:O	1:B:835:LYS:NZ	2.21	0.73
1:B:372:ILE:HA	1:B:375:LYS:HD2	1.71	0.72
1:A:616:VAL:CG2	1:A:744:PHE:CE1	2.68	0.71
1:B:521:ASN:HD21	1:B:535:LYS:HE3	1.55	0.71
1:A:75:GLU:OE2	1:A:308:ARG:NH2	2.22	0.71
1:B:347:GLU:HB3	1:B:502:PHE:HB3	1.72	0.70
1:A:833:ASN:O	1:A:835:LYS:NZ	2.23	0.70
1:A:111:LYS:HB2	1:A:183:SER:HB3	1.73	0.70
1:A:608:LEU:HD21	1:A:667:LYS:HG2	1.75	0.69
1:A:386:TYR:HD1	1:A:554:ASP:HA	1.59	0.68
1:B:616:VAL:HG22	1:B:744:PHE:CE1	2.29	0.67
1:A:174:SER:HB3	1:A:179:LEU:HD21	1.75	0.67
1:B:771:GLU:HB3	1:B:783:PRO:HB3	1.77	0.67
1:A:372:ILE:HA	1:A:375:LYS:HD2	1.77	0.66
1:A:771:GLU:HB3	1:A:783:PRO:HB3	1.78	0.66
1:B:75:GLU:OE2	1:B:308:ARG:NH2	2.29	0.65
1:A:756:ALA:HB1	1:A:761:LEU:HB2	1.78	0.65
1:B:174:SER:HB3	1:B:179:LEU:HD21	1.78	0.65
1:B:585:GLN:HA	1:B:588:ILE:HD12	1.78	0.64
1:A:803:LEU:HD12	1:A:819:LEU:HG	1.79	0.64
1:A:544:HIS:O	1:A:547:GLU:HB2	1.98	0.63
1:B:135:HIS:ND1	1:B:161:ASP:OD2	2.30	0.63
1:B:544:HIS:O	1:B:547:GLU:HB2	1.98	0.62
1:A:50:VAL:H	1:B:33:GLN:HE22	1.48	0.62
1:A:347:GLU:HB3	1:A:502:PHE:HB3	1.80	0.61
1:A:585:GLN:HA	1:A:588:ILE:HD12	1.81	0.61
1:A:829:ILE:O	1:A:833:ASN:ND2	2.28	0.60
1:A:117:SER:HB2	1:A:168:PHE:HZ	1.67	0.59
1:B:111:LYS:HB2	1:B:183:SER:HB3	1.83	0.59
1:A:135:HIS:ND1	1:A:161:ASP:OD2	2.36	0.59
1:A:611:ASP:HB3	1:A:747:LEU:HD21	1.84	0.59
1:A:350:THR:OG1	1:A:351:GLU:O	2.21	0.58
1:B:386:TYR:HB3	1:B:553:ILE:O	2.02	0.58
1:B:541:LEU:O	1:B:545:THR:N	2.35	0.58
1:A:107:GLN:HE21	1:A:109:ILE:HD11	1.67	0.58
1:B:491:ASN:OD1	1:B:491:ASN:N	2.33	0.58
1:A:782:PHE:O	1:A:784:LYS:NZ	2.36	0.58
1:A:561:ARG:NH1	1:A:565:ASP:OD1	2.37	0.58
1:A:71:VAL:O	1:A:111:LYS:NZ	2.37	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:71:VAL:O	1:B:111:LYS:NZ	2.36	0.57
1:A:616:VAL:CG2	1:A:744:PHE:CZ	2.88	0.57
1:B:107:GLN:HE21	1:B:109:ILE:HD11	1.70	0.57
1:A:674:THR:HB	1:A:758:ARG:NH2	2.20	0.57
1:B:829:ILE:O	1:B:833:ASN:ND2	2.28	0.56
1:B:756:ALA:HB1	1:B:761:LEU:HB2	1.86	0.56
1:A:602:ASP:OD1	1:A:660:ARG:NH2	2.39	0.56
1:B:561:ARG:NH1	1:B:565:ASP:OD1	2.39	0.56
1:A:756:ALA:HA	1:A:759:ASP:HB2	1.88	0.56
1:B:151:ALA:HA	1:B:173:GLN:O	2.06	0.56
1:B:602:ASP:N	1:B:602:ASP:OD1	2.39	0.55
1:A:231:GLU:O	1:A:278:ARG:NH2	2.39	0.55
1:A:753:ARG:HG3	1:A:766:ALA:HB1	1.87	0.55
1:B:753:ARG:HG3	1:B:766:ALA:HB1	1.88	0.55
1:A:602:ASP:OD1	1:A:602:ASP:N	2.40	0.54
1:A:756:ALA:O	1:A:760:GLY:N	2.40	0.54
1:A:57:GLU:OE1	1:A:57:GLU:N	2.38	0.54
1:A:575:GLY:O	1:A:629:LYS:NZ	2.35	0.54
1:A:562:ILE:O	1:A:566:SER:OG	2.26	0.54
1:B:388:THR:HG21	1:B:592:GLU:OE1	2.07	0.54
1:A:164:GLU:OE1	1:A:192:ARG:NH1	2.41	0.54
1:A:771:GLU:CD	1:A:784:LYS:H	2.12	0.54
1:B:147:PRO:HB2	1:B:290:PHE:HE1	1.73	0.54
1:B:796:ARG:NH1	1:B:822:ILE:HA	2.23	0.54
1:A:705:GLU:HA	1:A:729:ALA:HB1	1.90	0.53
1:A:246:GLU:HG3	1:A:296:LEU:HD11	1.90	0.53
1:A:815:ASP:H	1:A:816:PRO:HD2	1.72	0.53
1:A:538:ALA:HB3	1:A:541:LEU:HG	1.90	0.53
1:A:770:PHE:O	1:A:773:THR:OG1	2.24	0.53
1:A:491:ASN:OD1	1:A:491:ASN:N	2.35	0.53
1:B:670:TYR:CA	1:B:740:ILE:HD11	2.38	0.53
1:B:231:GLU:O	1:B:278:ARG:NH2	2.41	0.52
1:A:238:ILE:HG23	1:A:271:ALA:HB1	1.91	0.52
1:B:238:ILE:HG23	1:B:271:ALA:HB1	1.91	0.52
1:B:350:THR:OG1	1:B:351:GLU:O	2.27	0.52
1:A:796:ARG:HH12	1:A:822:ILE:HA	1.75	0.52
1:B:725:ILE:HG12	1:B:787:PRO:HB3	1.92	0.52
1:A:725:ILE:HG12	1:A:787:PRO:HB3	1.92	0.52
1:B:575:GLY:O	1:B:629:LYS:NZ	2.40	0.51
1:B:611:ASP:HB3	1:B:747:LEU:HD21	1.93	0.51
1:B:356:HIS:O	1:B:360:GLU:HG2	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:260:PRO:O	1:B:264:HIS:ND1	2.42	0.51
1:A:151:ALA:HA	1:A:173:GLN:O	2.11	0.51
1:B:735:ASP:HB3	1:B:752:ALA:HB2	1.93	0.51
1:B:768:ALA:HB2	1:B:787:PRO:HB2	1.92	0.51
1:B:771:GLU:CD	1:B:784:LYS:H	2.14	0.50
1:A:347:GLU:OE1	1:A:542:TYR:OH	2.20	0.50
1:A:138:ARG:HG3	1:A:140:VAL:HG23	1.94	0.50
1:A:502:PHE:HZ	1:A:536:VAL:HB	1.76	0.50
1:A:161:ASP:N	1:A:161:ASP:OD1	2.44	0.50
1:A:768:ALA:HB2	1:A:787:PRO:HB2	1.94	0.50
1:B:222:GLU:OE2	1:B:226:SER:OG	2.27	0.50
1:B:523:SER:OG	1:B:524:CYS:N	2.44	0.50
1:A:351:GLU:OE1	1:A:497:PRO:HD2	2.11	0.50
1:B:796:ARG:HH12	1:B:822:ILE:HA	1.77	0.49
1:A:521:ASN:HD21	1:A:535:LYS:HE3	1.77	0.49
1:B:194:LEU:HD12	1:B:198:GLN:HE21	1.77	0.49
1:A:674:THR:HB	1:A:758:ARG:CZ	2.43	0.49
1:B:538:ALA:HB3	1:B:541:LEU:HG	1.93	0.49
1:A:818:GLY:O	1:A:822:ILE:HB	2.12	0.49
1:B:351:GLU:OE1	1:B:497:PRO:HD2	2.13	0.49
1:A:260:PRO:O	1:A:264:HIS:ND1	2.45	0.49
1:A:352:GLU:N	1:A:352:GLU:OE1	2.46	0.48
1:A:252:LEU:HD13	1:A:260:PRO:HB2	1.94	0.48
1:B:42:TYR:O	1:B:45:SER:OG	2.26	0.48
1:B:251:SER:O	1:B:254:SER:OG	2.31	0.48
1:B:489:ASN:O	1:B:490:SER:OG	2.27	0.48
1:B:246:GLU:HG3	1:B:296:LEU:HD11	1.93	0.48
1:B:531:LEU:HD22	1:B:534:PHE:HD1	1.77	0.48
1:B:252:LEU:HD13	1:B:260:PRO:HB2	1.96	0.47
1:B:388:THR:HG22	1:B:391:ARG:HG2	1.95	0.47
1:B:465:ALA:O	1:B:469:LEU:HG	2.14	0.47
1:B:770:PHE:O	1:B:773:THR:OG1	2.32	0.47
1:A:465:ALA:O	1:A:469:LEU:HG	2.14	0.47
1:A:735:ASP:HB3	1:A:752:ALA:HB2	1.96	0.47
1:A:761:LEU:HD23	1:A:765:ILE:HG21	1.96	0.47
1:B:161:ASP:OD1	1:B:161:ASP:N	2.45	0.47
1:A:283:VAL:HG13	1:A:284:THR:HG23	1.97	0.47
1:B:371:GLN:HB3	1:B:375:LYS:HE3	1.97	0.47
1:B:811:SER:HB2	1:B:816:PRO:HG3	1.96	0.47
1:A:251:SER:O	1:A:254:SER:OG	2.27	0.46
1:B:796:ARG:O	1:B:800:LEU:HG	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:809:GLN:HB2	1:A:810:PRO:HD3	1.97	0.46
1:A:602:ASP:CG	1:A:660:ARG:HH21	2.18	0.46
1:A:702:LYS:O	1:A:705:GLU:HG2	2.15	0.46
1:B:138:ARG:HG3	1:B:140:VAL:HG23	1.97	0.46
1:A:531:LEU:HD13	1:A:534:PHE:CD1	2.50	0.46
1:A:796:ARG:O	1:A:800:LEU:HG	2.16	0.46
1:A:523:SER:OG	1:A:524:CYS:N	2.48	0.46
1:B:705:GLU:HA	1:B:729:ALA:HB1	1.98	0.46
1:A:125:LEU:HD12	1:A:125:LEU:HA	1.81	0.46
1:A:611:ASP:HB3	1:A:747:LEU:CD2	2.46	0.46
1:A:798:ASP:OD1	1:A:850:GLN:NE2	2.49	0.45
1:B:352:GLU:OE1	1:B:352:GLU:N	2.49	0.45
1:B:65:PRO:HB3	1:B:262:TYR:HD2	1.82	0.45
1:A:815:ASP:N	1:A:816:PRO:HD2	2.32	0.45
1:A:365:LEU:HB2	1:A:480:ILE:HD11	1.97	0.45
1:B:386:TYR:HD1	1:B:554:ASP:HA	1.81	0.45
1:A:473:LEU:HD23	1:A:473:LEU:HA	1.75	0.45
1:B:37:GLN:O	1:B:37:GLN:NE2	2.49	0.45
1:A:51:MET:HG3	1:A:79:VAL:HG22	1.99	0.45
1:A:783:PRO:HD2	1:A:829:ILE:HG12	1.97	0.45
1:B:702:LYS:O	1:B:705:GLU:HG2	2.16	0.45
1:B:117:SER:HB2	1:B:168:PHE:HZ	1.82	0.45
1:B:383:VAL:HG22	1:B:396:VAL:HG22	1.99	0.45
1:A:383:VAL:HG22	1:A:396:VAL:HG22	1.99	0.45
1:A:391:ARG:NH2	1:A:500:TRP:HH2	2.15	0.45
1:B:75:GLU:CD	1:B:308:ARG:HH21	2.17	0.45
1:A:121:PHE:CE1	1:A:166:THR:HG21	2.53	0.44
1:A:531:LEU:HD22	1:A:534:PHE:HD1	1.82	0.44
1:A:796:ARG:NH1	1:A:822:ILE:HA	2.32	0.44
1:B:256:TRP:O	1:B:257:LEU:HD23	2.17	0.44
1:A:610:LYS:O	1:A:614:ILE:HG13	2.17	0.44
1:B:473:LEU:HD23	1:B:473:LEU:HA	1.80	0.44
1:B:371:GLN:HB3	1:B:375:LYS:NZ	2.33	0.44
1:B:798:ASP:OD1	1:B:850:GLN:NE2	2.51	0.44
1:A:371:GLN:HB3	1:A:375:LYS:HE3	1.99	0.44
1:B:97:PRO:HA	1:B:202:HIS:CD2	2.53	0.44
1:B:288:ARG:O	1:B:292:ARG:HG3	2.18	0.44
1:B:868:ARG:NH1	1:B:872:GLN:HB2	2.33	0.44
1:A:288:ARG:O	1:A:292:ARG:HG3	2.18	0.43
1:A:222:GLU:OE2	1:A:226:SER:OG	2.32	0.43
1:A:541:LEU:O	1:A:545:THR:N	2.45	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:616:VAL:CG2	1:B:744:PHE:CE1	3.01	0.43
1:B:765:ILE:O	1:B:769:LEU:HG	2.18	0.43
1:A:775:PRO:O	1:A:796:ARG:NH2	2.51	0.43
1:B:556:GLN:O	1:B:559:LYS:N	2.51	0.43
1:B:756:ALA:O	1:B:760:GLY:N	2.51	0.43
1:A:65:PRO:HB3	1:A:262:TYR:HD2	1.83	0.43
1:A:543:LEU:O	1:A:547:GLU:HG3	2.17	0.43
1:A:101:GLN:OE1	1:A:229:TYR:HE2	2.02	0.43
1:B:818:GLY:O	1:B:819:LEU:HB2	2.19	0.43
1:B:240:LYS:HB3	1:B:240:LYS:HE3	1.81	0.43
1:A:703:ARG:HD3	1:A:851:PRO:HD3	2.01	0.43
1:B:676:LYS:HB2	1:B:681:PHE:CE2	2.53	0.43
1:B:354:PRO:O	1:B:358:VAL:HG23	2.19	0.42
1:A:670:TYR:O	1:A:674:THR:HG23	2.19	0.42
1:A:721:MET:O	1:A:725:ILE:HG13	2.19	0.42
1:A:728:ALA:HB2	1:A:765:ILE:HG23	2.00	0.42
1:B:783:PRO:HD2	1:B:829:ILE:HG12	2.00	0.42
1:A:559:LYS:HE3	1:A:584:VAL:HG11	2.01	0.42
1:B:623:TYR:O	1:B:625:PRO:HD3	2.20	0.42
1:A:147:PRO:O	1:A:150:GLY:N	2.52	0.42
1:B:498:ILE:O	1:B:499:ARG:HD3	2.20	0.42
1:B:283:VAL:HG13	1:B:284:THR:HG23	2.01	0.42
1:B:615:THR:CG2	1:B:746:SER:OG	2.68	0.42
1:A:42:TYR:O	1:A:45:SER:OG	2.27	0.42
1:B:526:LEU:HD23	1:B:526:LEU:HA	1.89	0.42
1:B:819:LEU:HD23	1:B:819:LEU:HA	1.84	0.42
1:A:193:ILE:O	1:A:197:LEU:HG	2.19	0.41
1:A:154:LEU:HD12	1:A:486:MET:HB3	2.02	0.41
1:A:580:PRO:O	1:A:584:VAL:HG23	2.20	0.41
1:B:91:SER:HB2	1:B:230:LEU:HD21	2.03	0.41
1:A:371:GLN:HB3	1:A:375:LYS:NZ	2.35	0.41
1:B:235:VAL:O	1:B:239:GLN:HG3	2.20	0.41
1:A:556:GLN:O	1:A:557:GLU:C	2.57	0.41
1:B:101:GLN:OE1	1:B:229:TYR:HE2	2.03	0.41
1:B:160:MET:HE2	1:B:160:MET:O	2.20	0.41
1:A:762:SER:HB3	1:A:765:ILE:HG13	2.01	0.41
1:B:172:GLN:NE2	1:B:486:MET:HB2	2.36	0.41
1:B:559:LYS:HE3	1:B:584:VAL:HG11	2.03	0.41
1:A:160:MET:O	1:A:160:MET:HE2	2.21	0.41
1:A:354:PRO:O	1:A:358:VAL:HG23	2.20	0.41
1:B:147:PRO:O	1:B:150:GLY:N	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:193:ILE:O	1:B:197:LEU:HG	2.21	0.41
1:A:615:THR:HG23	1:A:746:SER:OG	2.21	0.41
1:A:798:ASP:HA	1:A:846:VAL:HG11	2.03	0.41
1:B:347:GLU:OE1	1:B:542:TYR:OH	2.22	0.41
1:B:628:SER:HB2	1:B:635:LEU:HD21	2.03	0.41
1:B:769:LEU:O	1:B:772:ILE:HG22	2.21	0.41
1:B:774:LEU:HD13	1:B:781:VAL:HG23	2.02	0.41
1:A:64:ASN:OD1	1:A:66:LEU:N	2.34	0.41
1:A:531:LEU:HD13	1:A:534:PHE:CE1	2.56	0.41
1:B:747:LEU:HB3	1:B:751:MET:HG2	2.03	0.41
1:A:50:VAL:H	1:B:33:GLN:NE2	2.16	0.40
1:B:350:THR:OG1	1:B:351:GLU:N	2.52	0.40
1:B:712:ALA:HB2	1:B:790:VAL:HG11	2.03	0.40
1:A:235:VAL:O	1:A:239:GLN:HG3	2.21	0.40
1:A:256:TRP:O	1:A:257:LEU:HD23	2.21	0.40
1:B:64:ASN:OD1	1:B:66:LEU:N	2.34	0.40
1:B:543:LEU:O	1:B:547:GLU:HG3	2.21	0.40
1:B:721:MET:O	1:B:725:ILE:HG13	2.22	0.40
1:B:256:TRP:CE3	1:B:303:LEU:HD11	2.56	0.40
1:A:769:LEU:O	1:A:772:ILE:HG22	2.22	0.40
1:B:121:PHE:CE1	1:B:166:THR:HG21	2.56	0.40
1:B:803:LEU:HD12	1:B:819:LEU:HG	2.02	0.40
1:A:171:PHE:O	1:A:182:VAL:HG13	2.22	0.40
1:A:498:ILE:O	1:A:499:ARG:HD3	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	757/1045 (72%)	723 (96%)	32 (4%)	2 (0%)	41	75

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	757/1045 (72%)	723 (96%)	31 (4%)	3 (0%)	34	71
All	All	1514/2090 (72%)	1446 (96%)	63 (4%)	5 (0%)	44	75

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	815	ASP
1	A	816	PRO
1	B	557	GLU
1	B	819	LEU
1	B	810	PRO

5.3.2   Protein sidechains ⓘ

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	659/898 (73%)	611 (93%)	48 (7%)	14	46
1	B	659/898 (73%)	615 (93%)	44 (7%)	16	50
All	All	1318/1796 (73%)	1226 (93%)	92 (7%)	19	48

All (92) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	33	GLN
1	A	41	ASP
1	A	53	CYS
1	A	79	VAL
1	A	119	ASP
1	A	125	LEU
1	A	126	SER
1	A	132	VAL
1	A	161	ASP
1	A	183	SER
1	A	185	GLU

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Mol	Chain	Res	Type
1	A	191	GLU
1	A	196	SER
1	A	200	VAL
1	A	209	THR
1	A	212	ILE
1	A	221	ASN
1	A	236	ASP
1	A	259	ILE
1	A	275	LEU
1	A	277	SER
1	A	290	PHE
1	A	350	THR
1	A	388	THR
1	A	466	ASP
1	A	500	TRP
1	A	529	SER
1	A	534	PHE
1	A	553	ILE
1	A	554	ASP
1	A	566	SER
1	A	602	ASP
1	A	611	ASP
1	A	640	THR
1	A	650	VAL
1	A	665	ASP
1	A	667	LYS
1	A	671	LYS
1	A	676	LYS
1	A	707	THR
1	A	750	ILE
1	A	809	GLN
1	A	811	SER
1	A	813	THR
1	A	819	LEU
1	A	822	ILE
1	A	824	TYR
1	A	827	VAL
1	B	41	ASP
1	B	53	CYS
1	B	54	SER
1	B	79	VAL
1	B	119	ASP

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Mol	Chain	Res	Type
1	B	125	LEU
1	B	126	SER
1	B	132	VAL
1	B	161	ASP
1	B	167	GLN
1	B	183	SER
1	B	185	GLU
1	B	191	GLU
1	B	196	SER
1	B	200	VAL
1	B	209	THR
1	B	212	ILE
1	B	221	ASN
1	B	259	ILE
1	B	275	LEU
1	B	277	SER
1	B	290	PHE
1	B	350	THR
1	B	388	THR
1	B	466	ASP
1	B	487	ARG
1	B	491	ASN
1	B	500	TRP
1	B	529	SER
1	B	552	LEU
1	B	554	ASP
1	B	555	MET
1	B	602	ASP
1	B	640	THR
1	B	665	ASP
1	B	676	LYS
1	B	677	LYS
1	B	707	THR
1	B	750	ILE
1	B	809	GLN
1	B	810	PRO
1	B	811	SER
1	B	813	THR
1	B	821	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	33	GLN
1	B	521	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-33237. 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
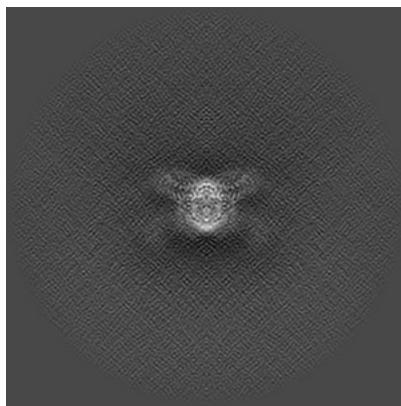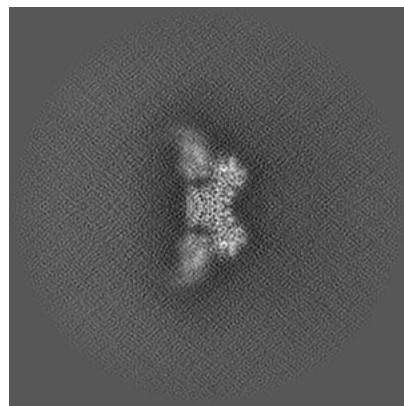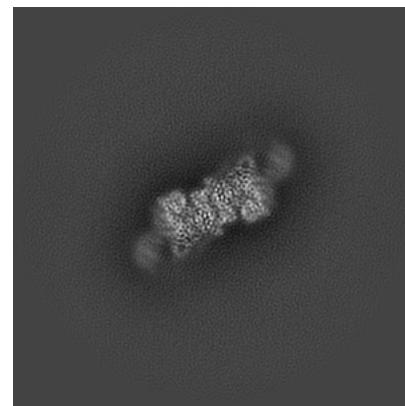
X   Y   Z

6.1.2 Raw map

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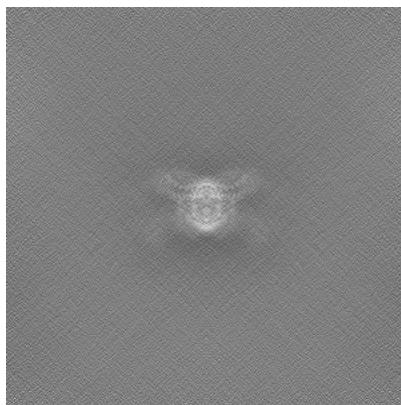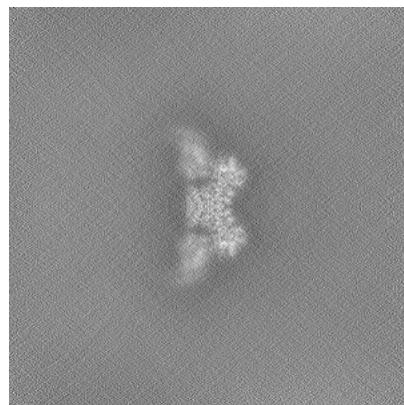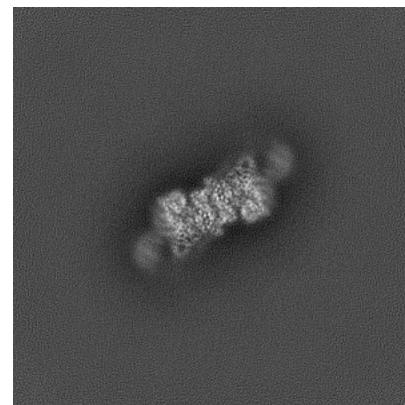
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

6.2.1 Primary map
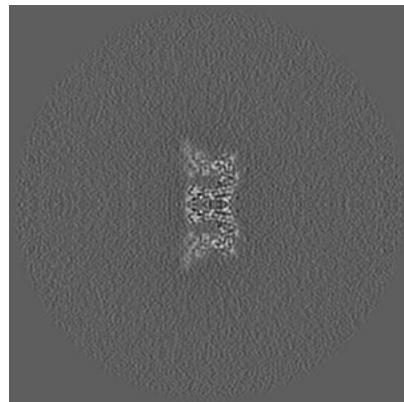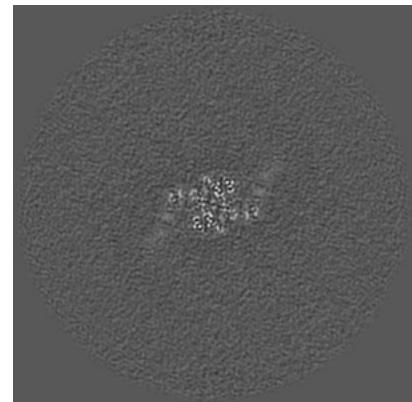
X Index: 192   Y Index: 192   Z Index: 192

6.2.2 Raw map
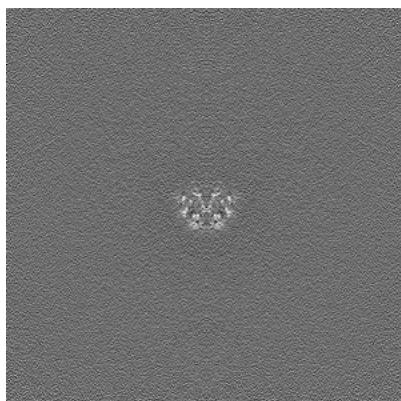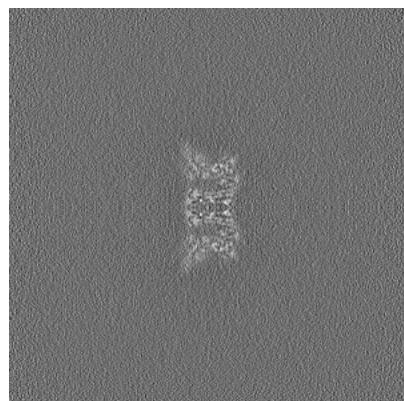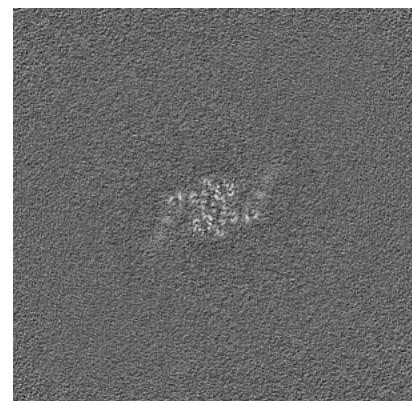
X Index: 192   Y Index: 192   Z Index: 192

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

6.3 Largest variance slices ⓘ
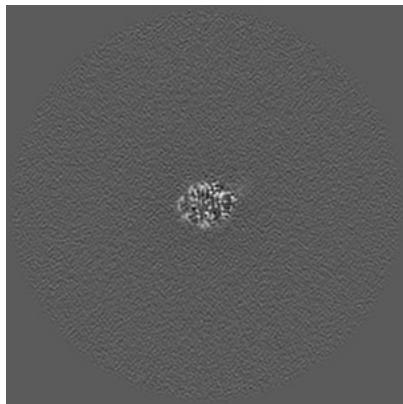
6.3.1 Primary map
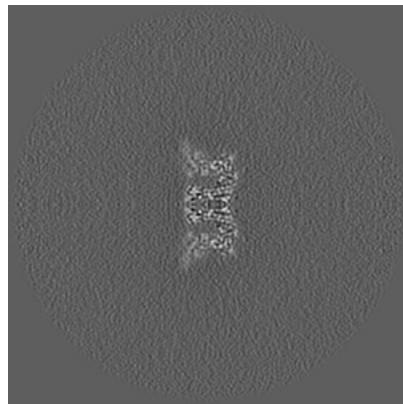
X Index: 199   Y Index: 192   Z Index: 202
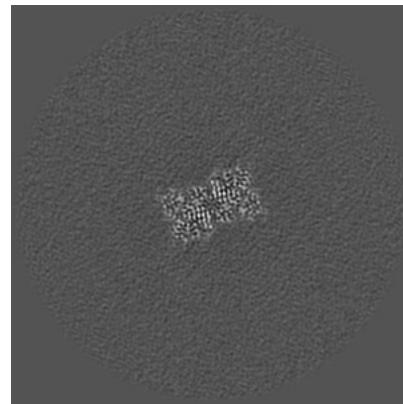
6.3.2 Raw map
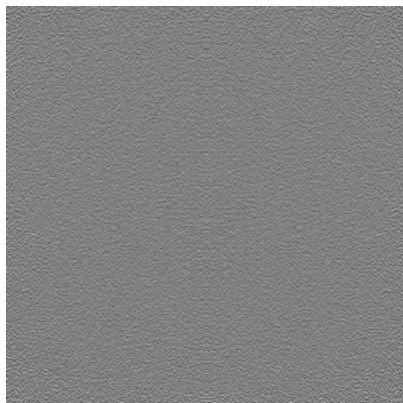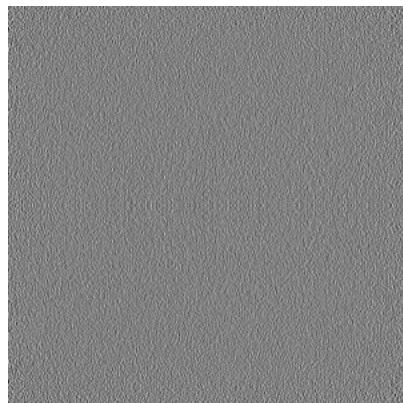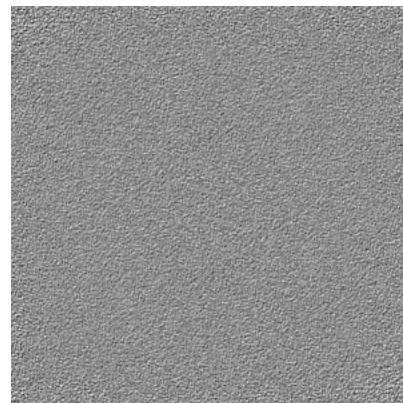
X Index: 0   Y Index: 0   Z Index: 0

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

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1 Primary map
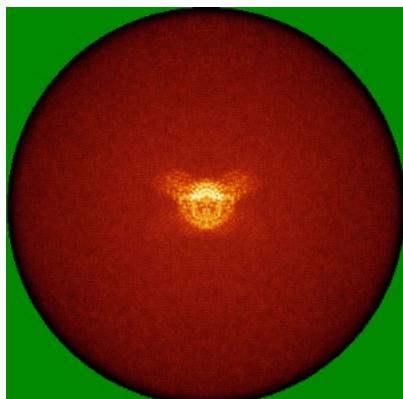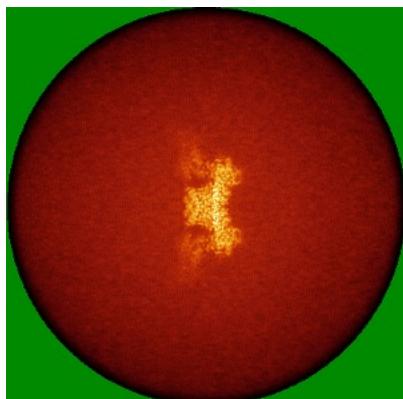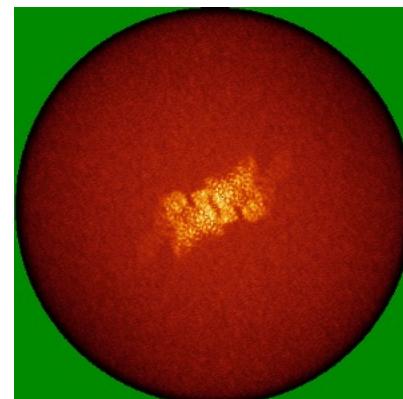
| X | Y | Z |

6.4.2 Raw map

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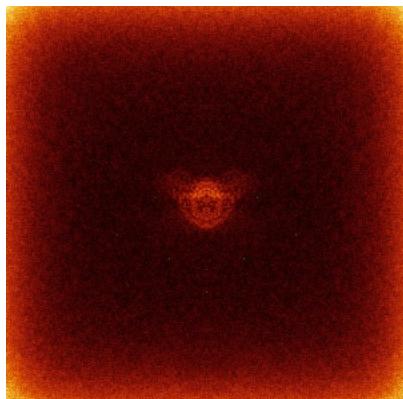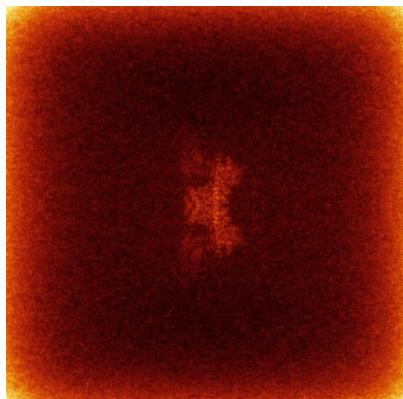
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X   Y   Z

The images above show the 3D surface view of the map at the recommended contour level 0.7. 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

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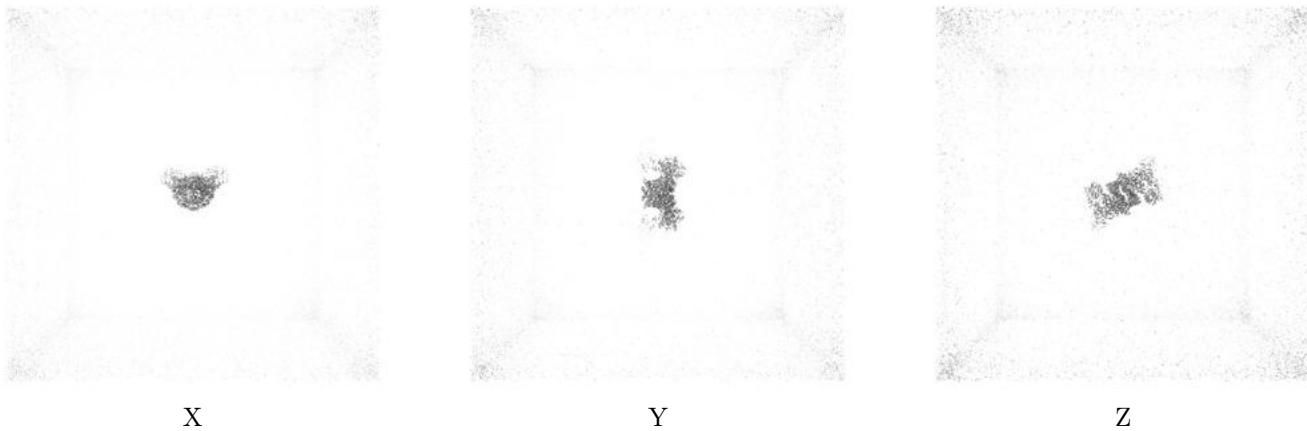
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

A mask typically either:

- Encompasses the whole structure

- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

6.6.1 emd_33237_msk_1.map (i)

| X | Y | Z |
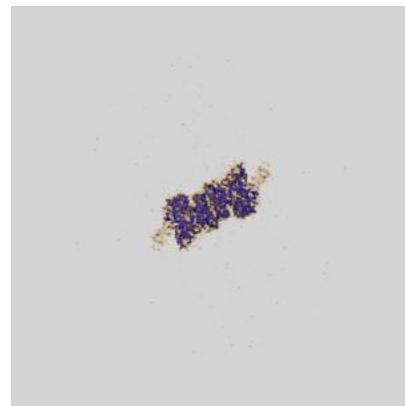
7 Map analysis ⓘ

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

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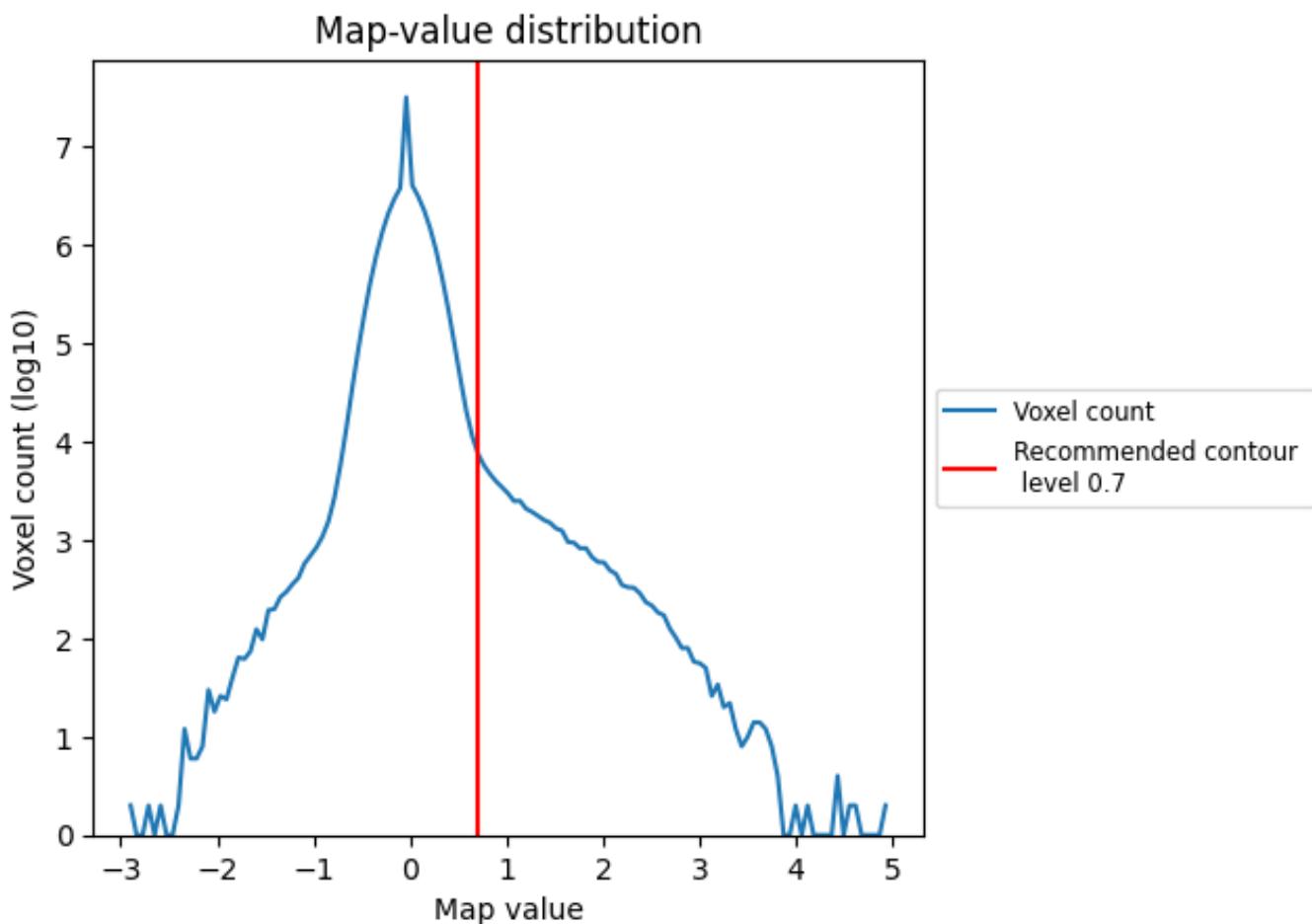
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2　Volume estimate ⓘ
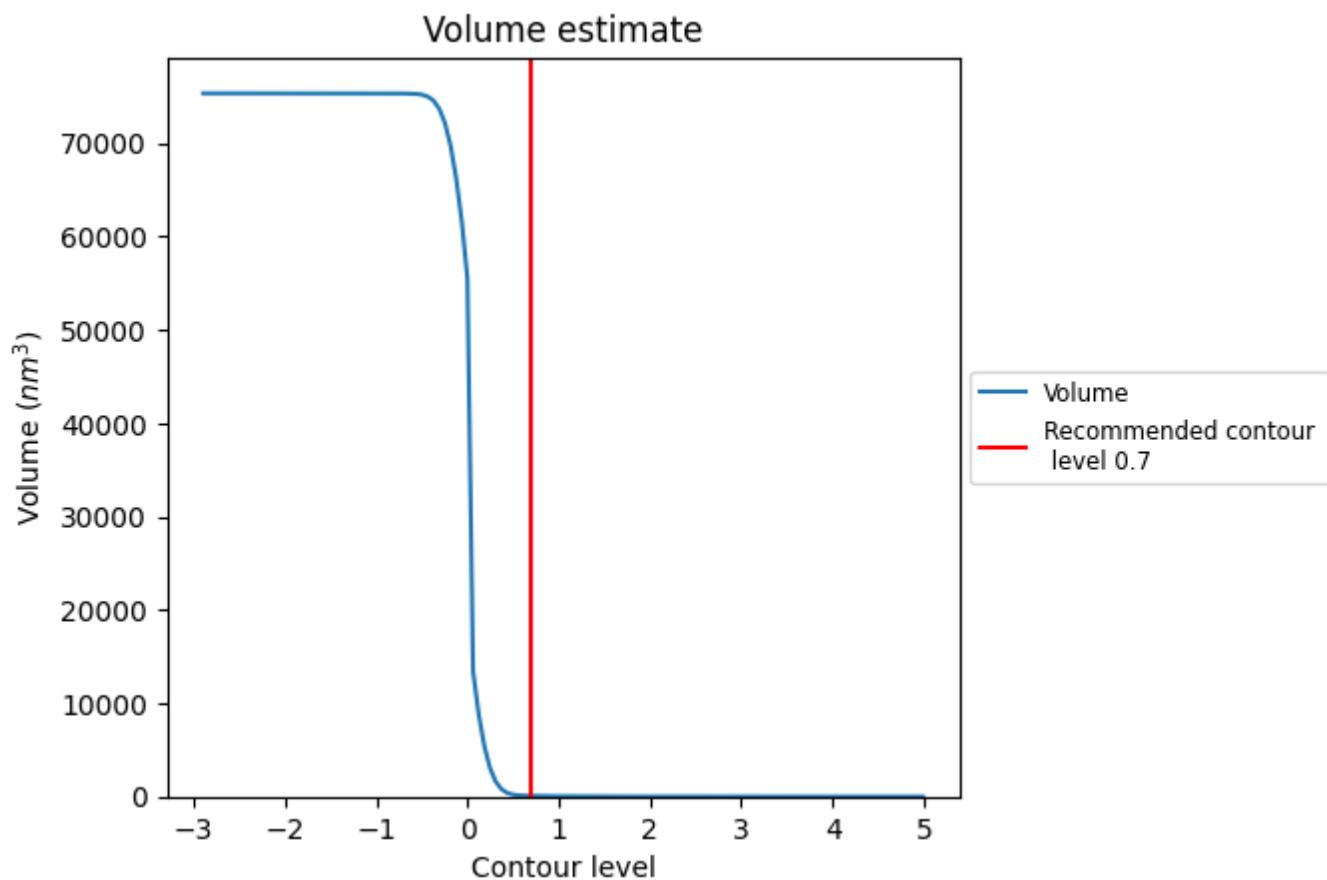
The volume at the recommended contour level is 74 nm^3; this corresponds to an approximate mass of 66 kDa.

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 ⓘ
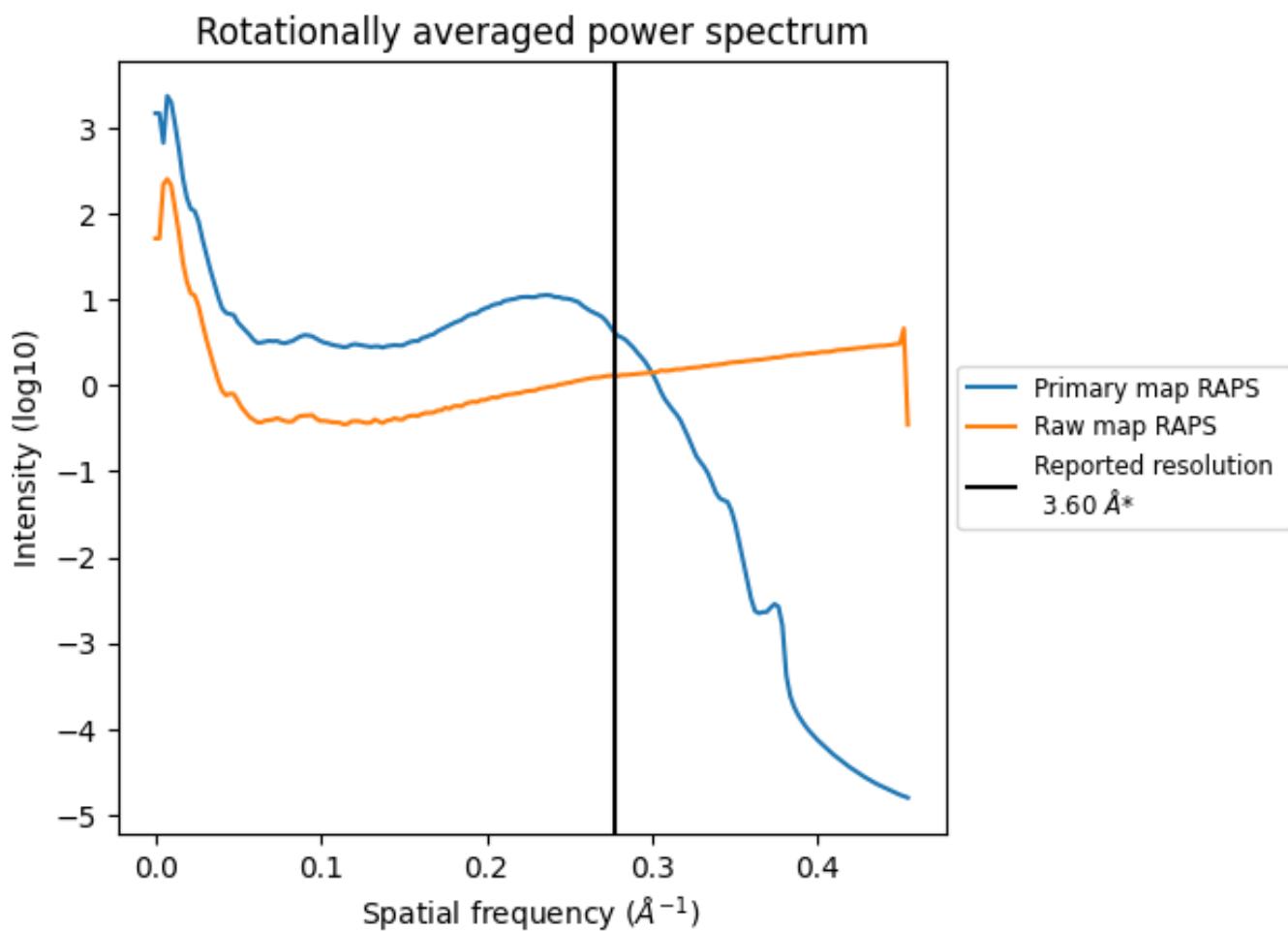
*Reported resolution corresponds to spatial frequency of 0.278 Å^{-1}

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)
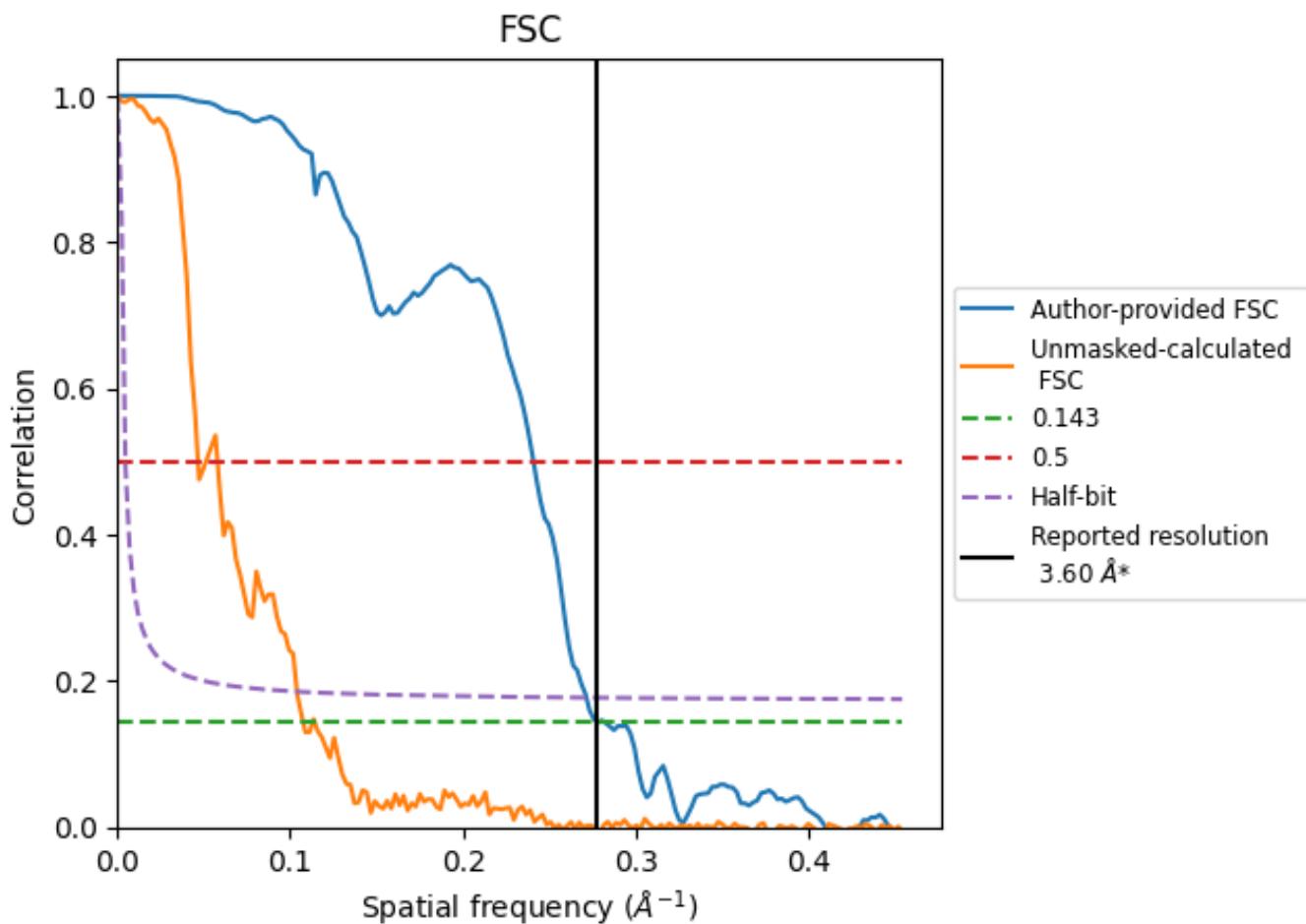
*Reported resolution corresponds to spatial frequency of 0.278 Å^{-1}

8.2   Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.60	-	-
Author-provided FSC curve	3.60	4.15	3.68
Unmasked-calculated*	9.29	21.41	9.62

*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 9.29 differs from the reported value 3.6 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-33237 and PDB model 7XJY. Per-residue inclusion information can be found in section 3 on page 5.

9.1 Map-model overlay ⓘ

| X | Y | Z |
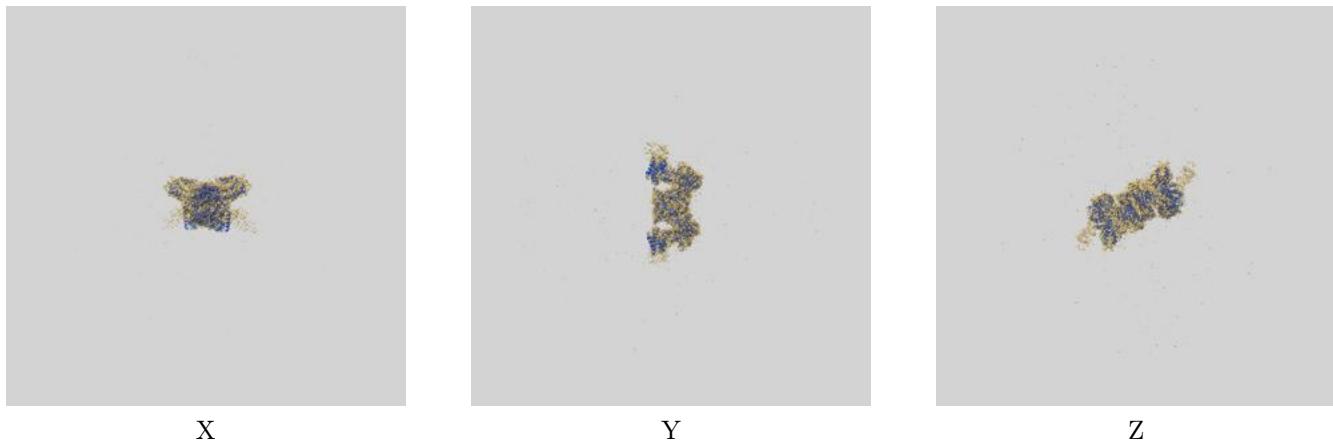
The images above show the 3D surface view of the map at the recommended contour level 0.7 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model ⓘ

X   Y   Z
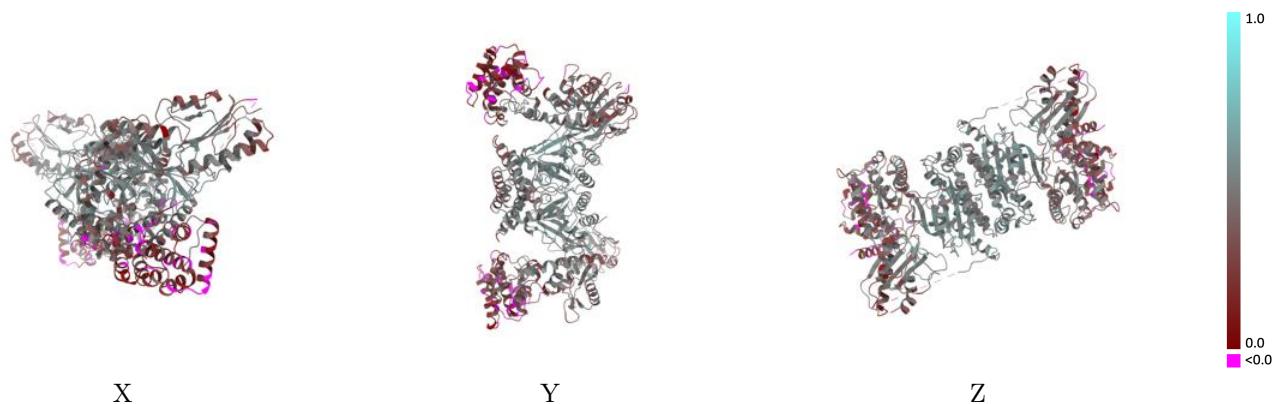
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 ⓘ

X   Y   Z
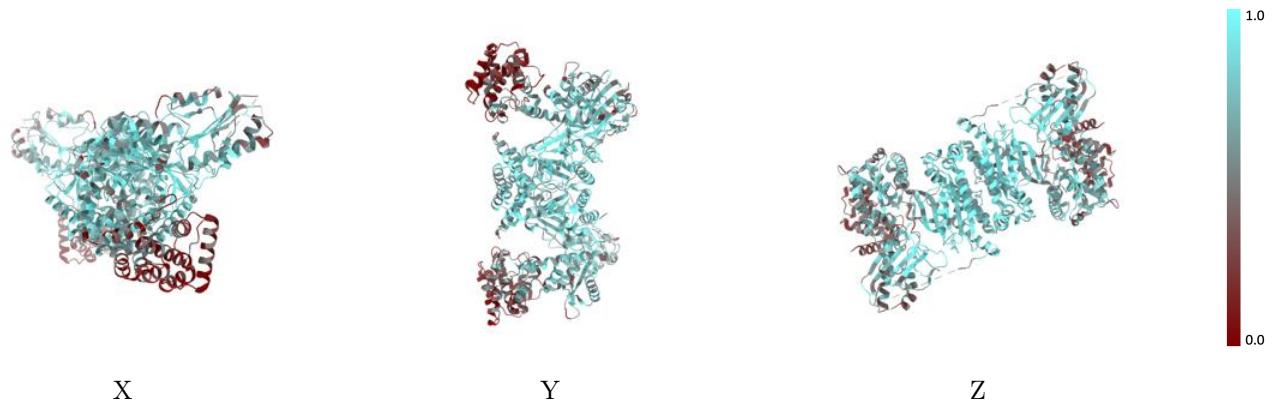
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.7).

9.4   Atom inclusion (i)
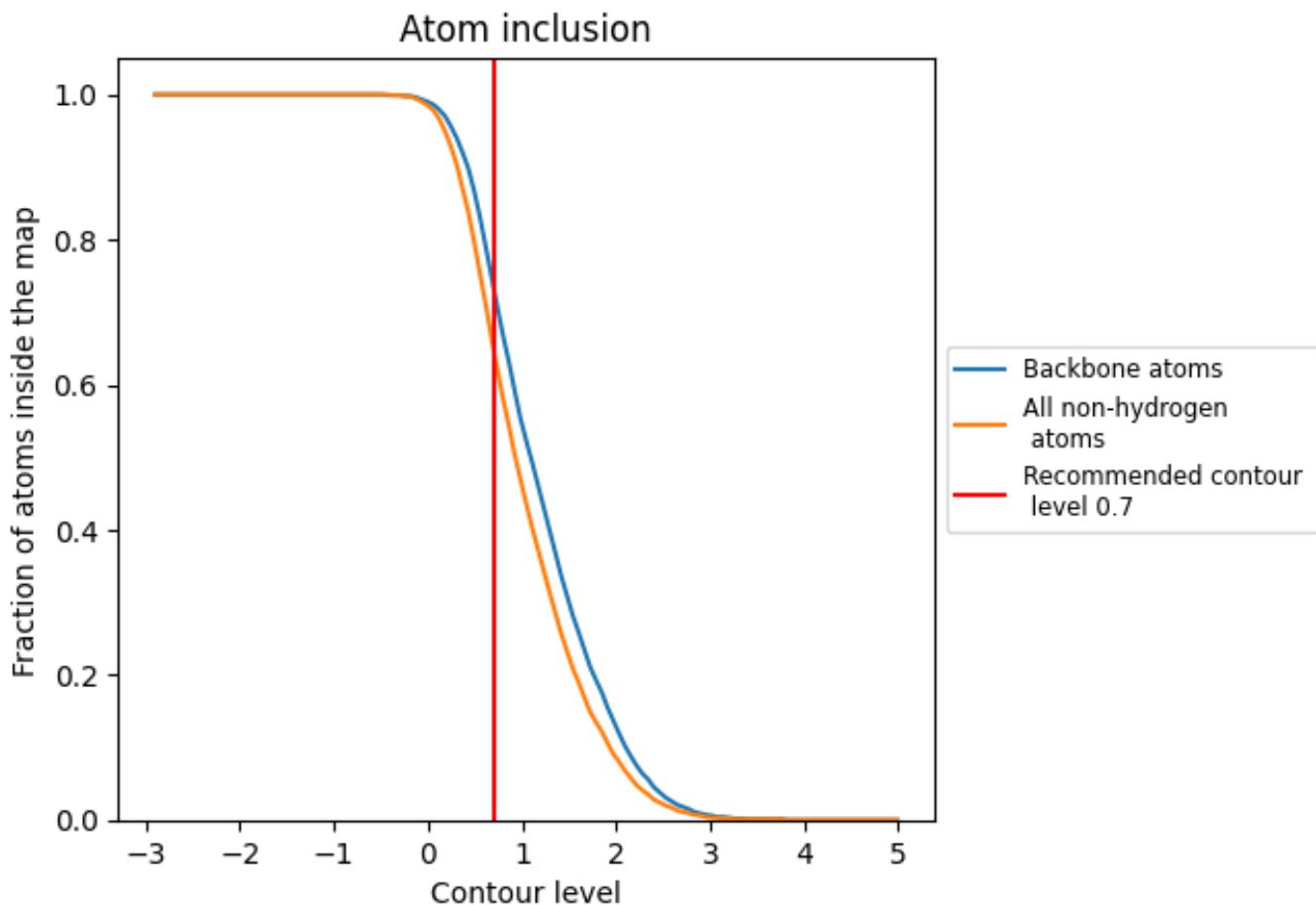
At the recommended contour level, 73% of all backbone atoms, 65% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.7) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6470	0.3990
A	0.6460	0.3990
B	0.6480	0.3990