



Full wwPDB EM Validation Report ⓘ

Mar 29, 2026 – 06:51 AM UTC

PDB ID : 9W9H / pdb_00009w9h
EMDB ID : EMD-65777
Title : Cryo-EM structure of the mouse kinesin-2 tail in complex with KAP3 adaptor
Authors : Jiang, X.; Danev, R.; Yanagisawa, H.; Kikkawa, M.
Deposited on : 2025-08-10
Resolution : 2.83 Å (reported)
Based on initial model : .

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.dev132
MolProbity : 4-5-2 with Phenix2.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

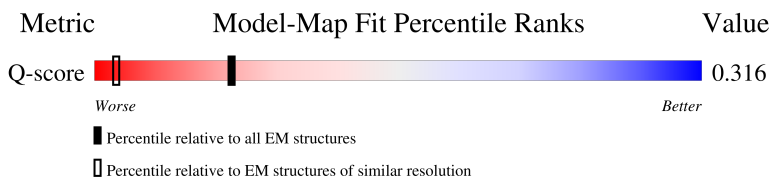
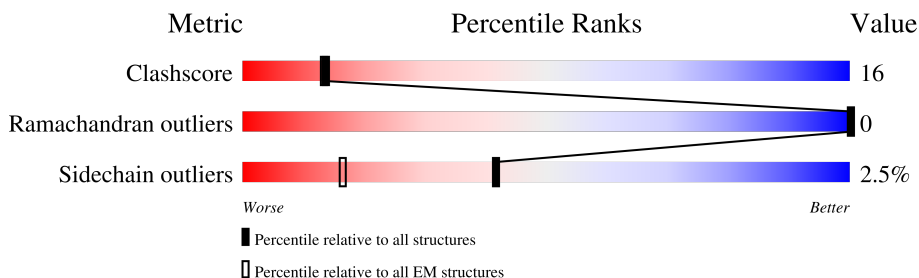
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.83 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11847 (2.33 - 3.33)

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	233	
2	B	273	
3	C	693	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6085 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 Kinesin-like protein KIF3A.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	79	Total	C	N	O	S	0	0
			668	426	112	126	4		

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	469	MET	-	initiating methionine	UNP P28741
A	470	GLY	-	expression tag	UNP P28741
A	471	SER	-	expression tag	UNP P28741
A	472	SER	-	expression tag	UNP P28741
A	473	HIS	-	expression tag	UNP P28741
A	474	HIS	-	expression tag	UNP P28741
A	475	HIS	-	expression tag	UNP P28741
A	476	HIS	-	expression tag	UNP P28741
A	477	HIS	-	expression tag	UNP P28741
A	478	HIS	-	expression tag	UNP P28741
A	479	SER	-	expression tag	UNP P28741
A	480	GLN	-	expression tag	UNP P28741

- Molecule 2 is a protein called Kinesin-like protein KIF3B.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	102	Total	C	N	O	S	0	0
			869	546	160	155	8		

- Molecule 3 is a protein called Kinesin-associated protein 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	561	Total	C	N	O	S	0	0
			4548	2916	748	849	35		

MET	LEU	ASN	GLN	GLY	ALA	ASN	THR	ASP	ALA	ARG	TYR	LEU	LYS	ARG	LYS	VAL	LYS	GLY	GLY	ASN	ILE	ASP	VAL	HIS	PRO	SER	GLU	LYS	ALA	LEU	ILE	VAL	GLN	TYR	GLU	VAL	GLN	LEU	TYR	GLU	ALA	THR	LEU	ILE	ASN	GLY	MET	ASP	LEU	PRO	MET	LEU	GLY	LYS	ARG	GLY	LYS	GLU	ASP	GLY	PRO	ASP	PRO	PRO	SER
PHE	GLU	GLY	MET	ILE	ASP	ILE	THR	ASP	GLU	V129	A130	N131	I132	M133	D134	M135	Y138	L142	Y143	E144	I146	P147	D148	K149	L155	Q158	L159	E167	E168	L169	L170	L171	N172	L179	V182	L183	D186	S190	L193	I197	I198	Y199	I200	F201	F202	F207	L213																		
I219	L222	I226	I227	D228	H229	E230	L231	K232	R233	L241	S242	K243	K244	A247	V248	D249	E250	D251	L252	E253	N254	Q255	T256	L257	R258	V281	Y284	R294	T295	E296	L297	K298	M299	R300	V305	H306	V309	R314	I321	E335	N336	M340	M343	D344																					
I345	V346	E347	K348	L349	M352	I353	P354	L360	L361	L368	L377	K380	M381	V382	L386	L387	L393	N396	E397	Y399	M404	I410	F416	M419	Y422	T423	D424	C425	I426	P427	Q428	L429	M432	L433	E439	R440	I441	L445	K456	Q460																									
G465	N466	M470	L471	A475	L476	P481	L482	M483	M484	K485	I487	K498	V505	G506	D507	I512	E523	C524	L528	A529	N530	L536	L542	R543	E544	Y545	K546	L551	K556	A559	I570	M571	V575	E606	F607	V608	I612	Y613	V614																										
M618	V619	F620	H621	Q622	R625	I628	P635	L638	I639	M642	H643	R650	K651	V652	D658	I659	I660	A661	E662	K670	E674	K675	H679	N680	S681	Q682	M683	L684	E685	M686	V687	E688	S689	ARG	GLN	LEU	ASP																												

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	539244	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	JEOL CRYO ARM 200	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	65.3	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	80000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.373	Depositor
Minimum map value	-0.072	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.014	Depositor
Recommended contour level	0.01	Depositor
Map size (Å)	228.4, 228.4, 228.4	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.571, 0.571, 0.571	Depositor

5 Model quality

5.1 Standard geometry

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	0/684	0.55	0/928
2	B	0.19	0/887	0.45	0/1190
3	C	0.30	0/4620	0.49	1/6233 (0.0%)
All	All	0.30	0/6191	0.49	1/8351 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	200	ILE	N-CA-C	-5.40	106.40	111.48

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	668	0	641	34	0
2	B	869	0	879	34	0
3	C	4548	0	4638	149	0
All	All	6085	0	6158	194	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 16.

All (194) 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)
3:C:198:ILE:CG2	3:C:281:VAL:HG22	1.65	1.27
3:C:387:LEU:CD1	3:C:419:MET:HE2	1.68	1.23
3:C:387:LEU:HD12	3:C:419:MET:CE	1.69	1.21
3:C:131:ASN:O	3:C:131:ASN:ND2	1.79	1.15
3:C:198:ILE:HG21	3:C:281:VAL:HG22	1.25	1.09
3:C:129:VAL:HG12	3:C:130:ALA:H	0.96	1.07
3:C:466:ASN:HB3	3:C:470:MET:HE2	1.41	1.00
3:C:129:VAL:HG12	3:C:130:ALA:N	1.78	0.97
3:C:135:MET:HE1	3:C:159:LEU:HD12	1.44	0.97
3:C:135:MET:CE	3:C:159:LEU:HD12	1.96	0.95
3:C:198:ILE:HG22	3:C:281:VAL:HG22	1.44	0.95
1:A:612:TRP:CE3	1:A:614:GLU:OE2	2.20	0.95
3:C:228:ASP:OD1	3:C:232:LYS:HE3	1.69	0.93
3:C:129:VAL:CG1	3:C:130:ALA:H	1.83	0.92
3:C:484:MET:HG3	3:C:523:GLU:HB3	1.51	0.92
3:C:198:ILE:HG23	3:C:202:PHE:HB2	1.53	0.90
3:C:639:ILE:HG23	3:C:674:GLU:HG2	1.57	0.87
3:C:198:ILE:CG2	3:C:281:VAL:CG2	2.52	0.86
3:C:198:ILE:HG22	3:C:281:VAL:CG2	2.04	0.85
3:C:484:MET:HG2	3:C:523:GLU:HB2	1.59	0.84
3:C:183:LEU:HD11	3:C:197:ILE:HG23	1.58	0.84
1:A:612:TRP:CZ3	1:A:614:GLU:OE2	2.32	0.83
3:C:138:TYR:CE2	3:C:155:LEU:HD21	2.14	0.82
3:C:361:LEU:HD23	3:C:399:TYR:CZ	2.16	0.80
3:C:131:ASN:HD22	3:C:131:ASN:C	1.89	0.78
3:C:138:TYR:CD2	3:C:155:LEU:HD22	2.18	0.78
2:B:587:ILE:HG12	2:B:591:ILE:HD12	1.67	0.76
3:C:183:LEU:HG	3:C:197:ILE:HG12	1.66	0.76
3:C:484:MET:HE3	3:C:524:CYS:SG	2.26	0.76
3:C:361:LEU:HD23	3:C:399:TYR:CE2	2.19	0.76
2:B:642:HIS:HA	2:B:645:MET:HE2	1.68	0.75
3:C:138:TYR:CD2	3:C:155:LEU:CD2	2.70	0.74
3:C:387:LEU:HD12	3:C:419:MET:HE2	0.81	0.74
3:C:484:MET:CG	3:C:523:GLU:CB	2.67	0.73
3:C:484:MET:HG3	3:C:523:GLU:CB	2.18	0.73
1:A:632:ARG:HH12	2:B:592:PRO:HB3	1.55	0.72
3:C:247:ALA:HB3	3:C:257:LEU:HD13	1.72	0.71
3:C:484:MET:CG	3:C:523:GLU:HB2	2.20	0.70
3:C:146:ILE:HG23	3:C:147:PRO:HD3	1.73	0.69
3:C:353:ILE:O	3:C:361:LEU:HD13	1.92	0.69
2:B:636:LYS:HE2	2:B:658:GLU:OE2	1.95	0.67
3:C:231:LEU:HD23	3:C:314:ARG:HH21	1.59	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:135:MET:HG3	3:C:135:MET:O	1.96	0.65
3:C:135:MET:HE2	3:C:159:LEU:HD12	1.79	0.64
3:C:571:MET:HA	3:C:571:MET:HE2	1.79	0.64
3:C:198:ILE:CG2	3:C:202:PHE:HB2	2.26	0.63
3:C:643:HIS:CE1	3:C:675:LYS:HG3	2.33	0.63
3:C:131:ASN:OD1	3:C:158:GLN:HB2	1.99	0.63
3:C:228:ASP:CG	3:C:232:LYS:HE3	2.24	0.62
3:C:135:MET:HE3	3:C:169:LEU:CD2	2.30	0.61
3:C:614:VAL:O	3:C:618:MET:HG2	2.00	0.61
2:B:596:LYS:O	2:B:600:MET:HG2	2.01	0.60
3:C:642:MET:O	3:C:650:ARG:HG2	2.02	0.60
3:C:198:ILE:HG22	3:C:199:TYR:N	2.17	0.60
3:C:135:MET:HE3	3:C:169:LEU:HD21	1.83	0.59
3:C:433:LEU:HD23	3:C:471:LEU:HD11	1.85	0.59
3:C:612:ILE:HG22	3:C:652:VAL:HG12	1.85	0.59
3:C:198:ILE:HG21	3:C:281:VAL:CG2	2.18	0.59
3:C:305:VAL:O	3:C:309:VAL:HG23	2.03	0.58
3:C:426:ILE:N	3:C:427:PRO:HD2	2.18	0.58
3:C:197:ILE:HB	3:C:198:ILE:HD12	1.84	0.58
3:C:198:ILE:HG22	3:C:199:TYR:H	1.67	0.58
1:A:589:LEU:O	1:A:593:ILE:HG13	2.03	0.58
3:C:138:TYR:CG	3:C:155:LEU:HD22	2.39	0.58
3:C:138:TYR:CE2	3:C:155:LEU:CD2	2.85	0.58
1:A:618:GLU:C	2:B:578:ARG:HH22	2.11	0.58
3:C:387:LEU:CG	3:C:419:MET:HE2	2.32	0.57
3:C:542:LEU:HD11	3:C:575:VAL:HG11	1.85	0.57
3:C:361:LEU:HD11	3:C:393:LEU:HD21	1.87	0.57
3:C:622:GLN:HG3	3:C:625:ARG:HH22	1.71	0.56
3:C:441:ILE:HD12	3:C:483:LEU:HD13	1.89	0.55
1:A:627:THR:HG21	2:B:589:ASN:HB3	1.89	0.55
2:B:616:PRO:HG3	2:B:619:ARG:NH1	2.23	0.54
3:C:476:LEU:HD11	3:C:507:ASP:HB3	1.89	0.54
3:C:190:SER:HB2	3:C:193:LEU:HB3	1.88	0.54
2:B:596:LYS:O	2:B:599:ILE:HG13	2.08	0.54
2:B:621:GLU:O	2:B:622:ASN:HB2	2.08	0.54
1:A:621:LEU:HD23	1:A:624:VAL:HG23	1.89	0.53
3:C:247:ALA:C	3:C:257:LEU:HD22	2.32	0.53
3:C:635:PRO:O	3:C:639:ILE:HD13	2.08	0.53
3:C:142:LEU:HD21	3:C:179:LEU:HD13	1.90	0.53
1:A:632:ARG:HH22	2:B:592:PRO:HA	1.72	0.53
3:C:219:ILE:HA	3:C:222:LEU:HD12	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:619:TRP:NE1	2:B:582:LEU:HB2	2.24	0.53
3:C:377:LEU:O	3:C:381:MET:HG3	2.08	0.53
3:C:529:ALA:HB1	3:C:570:ILE:HG22	1.91	0.53
3:C:295:THR:HG22	3:C:299:MET:HE3	1.91	0.53
1:A:590:GLN:HA	1:A:593:ILE:HD12	1.90	0.52
3:C:135:MET:HE3	3:C:169:LEU:HG	1.91	0.52
3:C:382:VAL:HG21	3:C:416:PHE:CE1	2.44	0.52
3:C:620:PHE:O	3:C:620:PHE:CD1	2.62	0.52
2:B:579:GLU:O	2:B:583:LYS:HG2	2.09	0.52
3:C:170:LEU:HD21	3:C:213:LEU:HD13	1.91	0.52
3:C:505:VAL:HG11	3:C:536:LEU:HD21	1.92	0.52
3:C:456:LYS:O	3:C:460:GLN:HG2	2.10	0.52
3:C:512:ILE:HD12	3:C:528:LEU:HD12	1.91	0.52
2:B:647:MET:HG2	2:B:656:ARG:CZ	2.40	0.51
3:C:612:ILE:HG23	3:C:638:LEU:HD21	1.91	0.51
3:C:551:LEU:HD11	3:C:571:MET:HG3	1.93	0.51
3:C:622:GLN:HG3	3:C:625:ARG:NH2	2.26	0.51
3:C:229:HIS:CD2	3:C:233:ARG:HH12	2.30	0.50
2:B:583:LYS:HA	2:B:586:ILE:HG12	1.92	0.50
3:C:198:ILE:CG2	3:C:199:TYR:H	2.24	0.50
3:C:361:LEU:CD2	3:C:399:TYR:CE2	2.92	0.50
3:C:481:PRO:O	3:C:485:LYS:HG3	2.11	0.50
3:C:183:LEU:HD22	3:C:222:LEU:HD22	1.94	0.50
3:C:297:LEU:HA	3:C:300:ARG:HG2	1.93	0.50
3:C:145:ASP:OD1	3:C:148:ASP:HB2	2.12	0.49
3:C:131:ASN:CG	3:C:159:LEU:CD2	2.86	0.49
2:B:641:GLN:O	2:B:645:MET:HG3	2.13	0.49
3:C:146:ILE:HA	3:C:149:LYS:HG3	1.95	0.48
3:C:321:ILE:HD12	3:C:360:LEU:HD13	1.95	0.48
1:A:591:MET:HA	1:A:591:MET:HE2	1.95	0.48
3:C:243:LYS:NZ	3:C:243:LYS:HB2	2.28	0.48
3:C:252:LEU:HB3	3:C:254:ASN:HD21	1.78	0.48
3:C:198:ILE:O	3:C:199:TYR:HB2	2.13	0.48
3:C:419:MET:HA	3:C:422:TYR:CD2	2.48	0.48
3:C:138:TYR:CD2	3:C:155:LEU:HD21	2.42	0.48
3:C:404:MET:HE1	3:C:432:MET:HE1	1.96	0.48
3:C:294:ARG:O	3:C:298:LYS:HG3	2.14	0.47
3:C:545:TYR:O	3:C:546:LYS:C	2.57	0.47
3:C:556:LYS:HB2	3:C:559:ALA:HB2	1.95	0.47
3:C:423:THR:O	3:C:424:ASP:C	2.57	0.47
3:C:135:MET:HE3	3:C:169:LEU:CG	2.43	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:353:ILE:HG22	3:C:354:PRO:HD3	1.95	0.47
1:A:591:MET:HE1	2:B:583:LYS:HZ3	1.79	0.47
3:C:380:LYS:HE2	3:C:380:LYS:HB2	1.60	0.47
1:A:581:ARG:O	1:A:585:ARG:HG2	2.15	0.47
3:C:167:GLU:O	3:C:171:LEU:HD12	2.15	0.47
3:C:404:MET:HE1	3:C:445:LEU:HD13	1.97	0.47
1:A:585:ARG:HH12	1:A:588:ARG:HG3	1.80	0.46
1:A:618:GLU:HA	2:B:578:ARG:HH12	1.79	0.46
2:B:653:PRO:HB3	2:B:660:ILE:HB	1.97	0.46
1:A:621:LEU:HD11	3:C:683:TRP:HZ2	1.80	0.46
1:A:658:THR:HG22	3:C:294:ARG:HH22	1.81	0.46
3:C:387:LEU:HD21	3:C:410:ILE:HG21	1.97	0.46
1:A:590:GLN:OE1	2:B:583:LYS:HB2	2.16	0.46
1:A:632:ARG:HH12	2:B:592:PRO:CB	2.27	0.46
3:C:498:LYS:HE2	3:C:530:ASN:O	2.16	0.46
3:C:131:ASN:CG	3:C:159:LEU:HD21	2.41	0.45
3:C:475:ALA:HB2	3:C:483:LEU:HD23	1.98	0.45
3:C:198:ILE:CG2	3:C:199:TYR:N	2.79	0.45
2:B:617:ILE:HG12	3:C:658:ASP:HB3	1.97	0.45
3:C:258:ARG:NE	3:C:258:ARG:HA	2.31	0.45
3:C:426:ILE:H	3:C:427:PRO:HD2	1.80	0.45
1:A:593:ILE:HG12	2:B:599:ILE:HD11	1.99	0.44
3:C:368:LEU:HD13	3:C:386:LEU:HD21	2.00	0.44
1:A:632:ARG:NH1	2:B:592:PRO:HB3	2.29	0.44
2:B:625:MET:SD	3:C:620:PHE:HZ	2.40	0.44
3:C:197:ILE:HD13	3:C:226:ILE:HD13	1.99	0.44
2:B:618:THR:HG22	3:C:662:GLU:OE2	2.17	0.44
3:C:336:ASN:O	3:C:340:MET:HG2	2.17	0.44
1:A:623:CYS:HB3	1:A:626:TYR:HD2	1.82	0.44
2:B:639:LEU:H	3:C:606:GLU:HG3	1.82	0.44
3:C:306:HIS:HB2	3:C:343:MET:HE1	1.98	0.44
1:A:583:LEU:HA	1:A:586:GLU:HG3	1.98	0.44
3:C:608:VAL:O	3:C:612:ILE:HG12	2.18	0.43
1:A:619:TRP:CD2	2:B:582:LEU:HD13	2.53	0.43
1:A:589:LEU:HD23	1:A:589:LEU:HA	1.82	0.43
1:A:601:ASP:O	1:A:604:GLU:HG3	2.18	0.43
3:C:353:ILE:O	3:C:361:LEU:CD1	2.65	0.43
3:C:344:ASP:HB3	3:C:347:GLU:OE1	2.18	0.43
3:C:428:GLN:HG3	3:C:429:LEU:N	2.32	0.43
1:A:584:SER:O	1:A:587:LEU:HG	2.19	0.43
3:C:252:LEU:HB3	3:C:254:ASN:ND2	2.32	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:579:GLU:OE1	2:B:580:LEU:HD22	2.19	0.43
3:C:135:MET:HG2	3:C:172:ASN:HD22	1.82	0.42
1:A:627:THR:O	1:A:631:MET:HG2	2.19	0.42
1:A:593:ILE:HG22	2:B:591:ILE:HD13	2.01	0.42
1:A:636:PRO:O	1:A:637:VAL:C	2.62	0.42
3:C:387:LEU:HD12	3:C:419:MET:SD	2.56	0.42
1:A:597:PHE:CE1	3:C:675:LYS:NZ	2.87	0.42
2:B:578:ARG:HA	2:B:578:ARG:HD2	1.85	0.42
2:B:649:ILE:HG13	2:B:650:ARG:HG3	2.02	0.42
3:C:149:LYS:HB3	3:C:193:LEU:HD13	2.01	0.42
3:C:628:ILE:HD13	3:C:628:ILE:HA	1.96	0.42
1:A:657:TYR:CE2	3:C:300:ARG:HD2	2.55	0.42
3:C:428:GLN:O	3:C:432:MET:HG3	2.19	0.41
3:C:182:VAL:O	3:C:186:ASP:HB2	2.20	0.41
3:C:241:LEU:HD23	3:C:241:LEU:HA	1.89	0.41
1:A:591:MET:HE1	2:B:583:LYS:NZ	2.34	0.41
1:A:632:ARG:CZ	3:C:679:HIS:CE1	3.03	0.41
3:C:145:ASP:O	3:C:149:LYS:HG2	2.20	0.41
3:C:396:ASN:O	3:C:397:GLU:HG2	2.21	0.41
3:C:135:MET:HG2	3:C:172:ASN:ND2	2.35	0.41
3:C:207:PHE:CD1	3:C:207:PHE:N	2.89	0.41
3:C:244:LYS:O	3:C:257:LEU:HD11	2.20	0.41
3:C:528:LEU:HD23	3:C:528:LEU:HA	1.83	0.41
3:C:643:HIS:NE2	3:C:675:LYS:HG3	2.36	0.41
3:C:198:ILE:HG22	3:C:281:VAL:HG21	1.94	0.40
3:C:345:ILE:O	3:C:349:LEU:HG	2.22	0.40
2:B:645:MET:HE3	2:B:645:MET:HB2	1.89	0.40
3:C:404:MET:CE	3:C:445:LEU:HD13	2.51	0.40
3:C:484:MET:HA	3:C:487:ILE:HD12	2.02	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	77/233 (33%)	73 (95%)	4 (5%)	0	100	100
2	B	100/273 (37%)	97 (97%)	3 (3%)	0	100	100
3	C	559/693 (81%)	527 (94%)	32 (6%)	0	100	100
All	All	736/1199 (61%)	697 (95%)	39 (5%)	0	100	100

There are no Ramachandran outliers to report.

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	74/213 (35%)	74 (100%)	0	100	100
2	B	98/250 (39%)	94 (96%)	4 (4%)	27	52
3	C	510/631 (81%)	497 (98%)	13 (2%)	42	66
All	All	682/1094 (62%)	665 (98%)	17 (2%)	42	66

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	630	VAL
2	B	649	ILE
2	B	662	LEU
2	B	671	THR
3	C	131	ASN
3	C	132	ILE
3	C	159	LEU
3	C	213	LEU
3	C	284	TYR
3	C	335	GLU
3	C	343	MET
3	C	352	MET
3	C	353	ILE
3	C	428	GLN
3	C	544	GLU

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Mol	Chain	Res	Type
3	C	660	ILE
3	C	670	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	590	GLN
1	A	596	ASN
1	A	608	ASN
2	B	584	HIS
2	B	615	HIS
3	C	610	GLN
3	C	679	HIS

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 oligosaccharides 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.

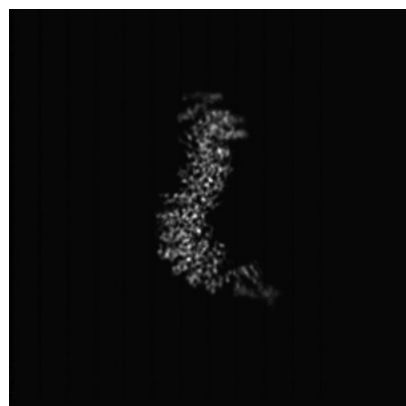
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-65777. 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

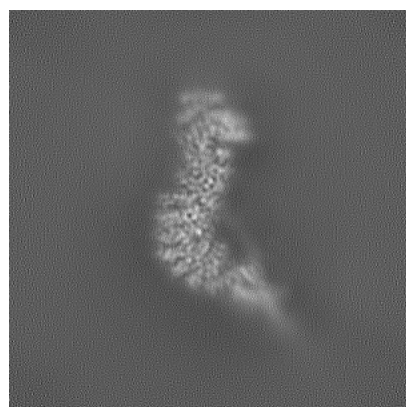


Y

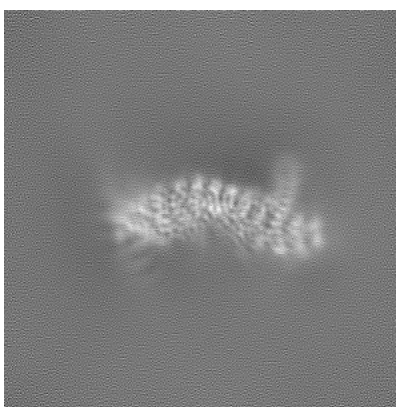


Z

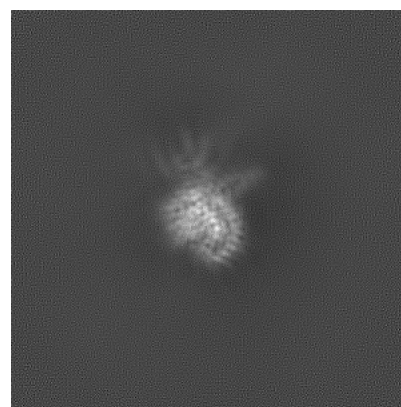
6.1.2 Raw map



X



Y



Z

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

6.2 Central slices [i](#)

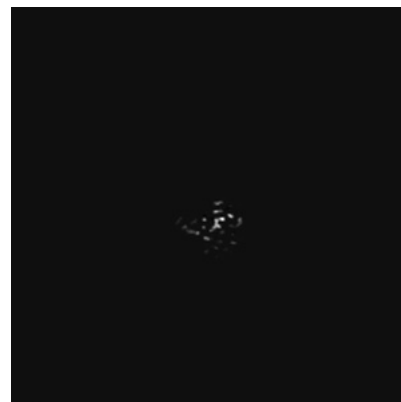
6.2.1 Primary map



X Index: 200

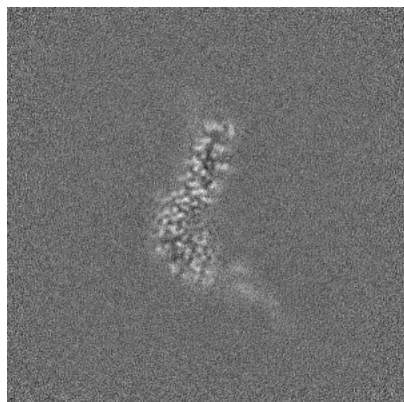


Y Index: 200

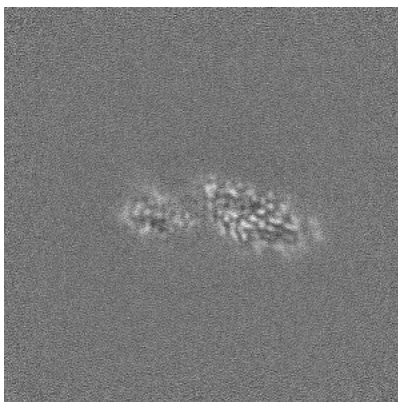


Z Index: 200

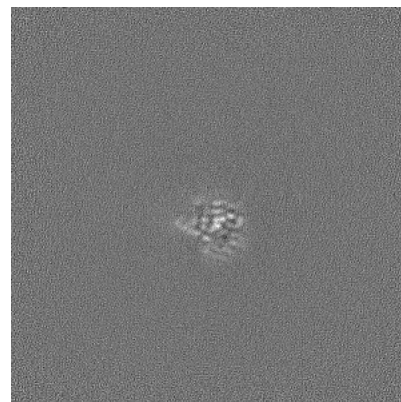
6.2.2 Raw map



X Index: 200



Y Index: 200



Z Index: 200

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

6.3 Largest variance slices [i](#)

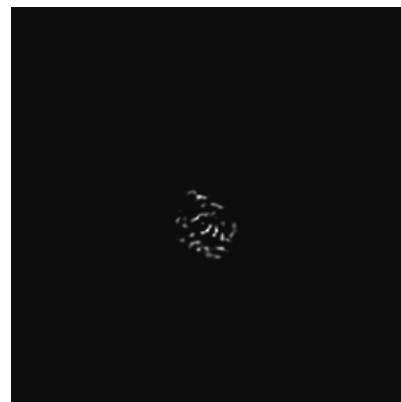
6.3.1 Primary map



X Index: 205

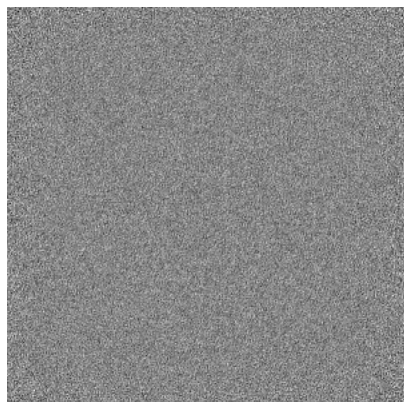


Y Index: 198

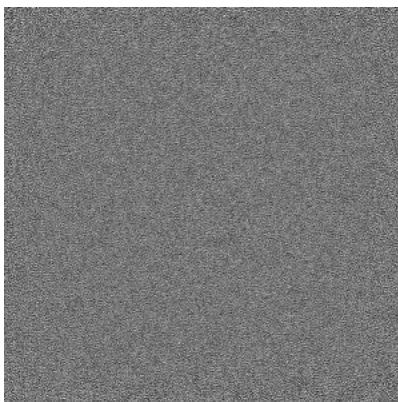


Z Index: 155

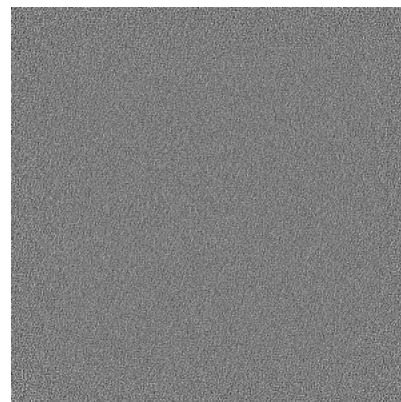
6.3.2 Raw map



X Index: 0



Y Index: 0

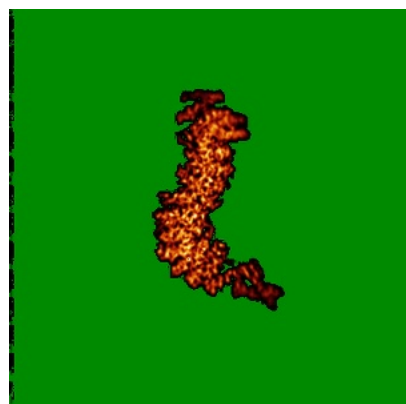


Z Index: 0

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

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

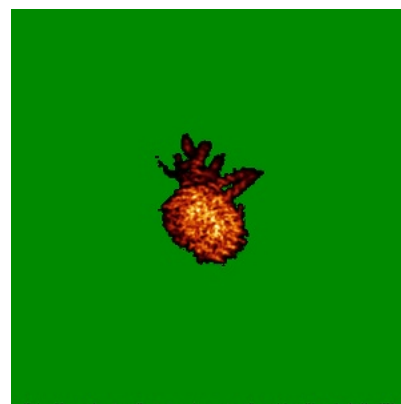
6.4.1 Primary map



X

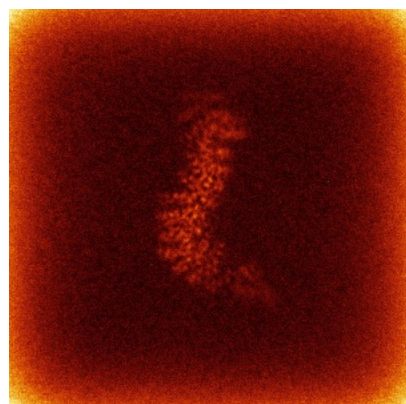


Y

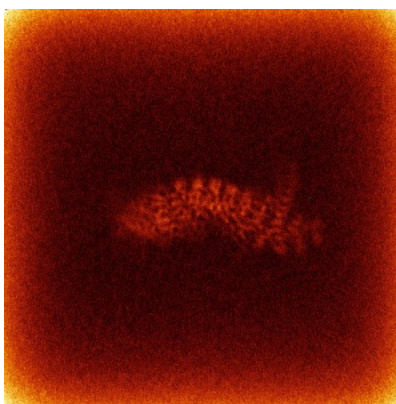


Z

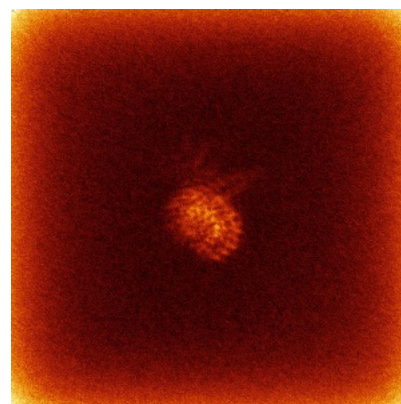
6.4.2 Raw map



X



Y



Z

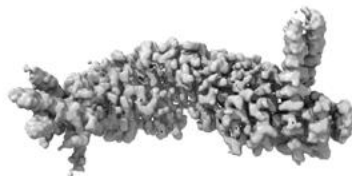
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

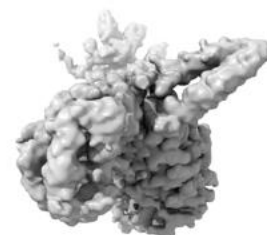
6.5.1 Primary map



X



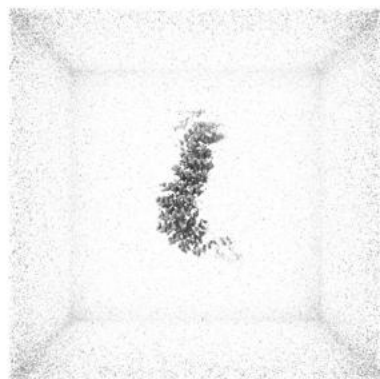
Y



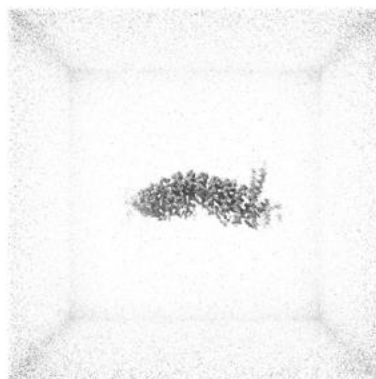
Z

The images above show the 3D surface view of the map at the recommended contour level 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

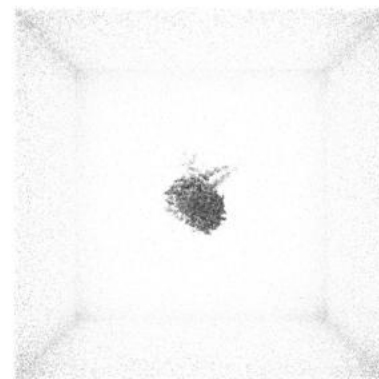
6.5.2 Raw map



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.

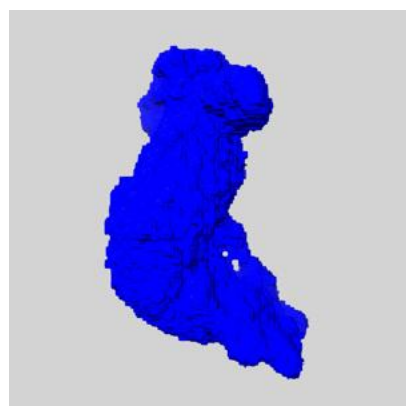
6.6 Mask visualisation [i](#)

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

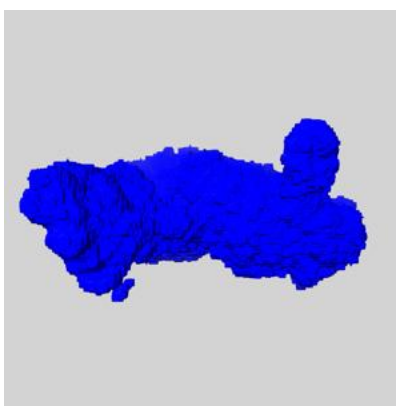
A mask typically either:

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

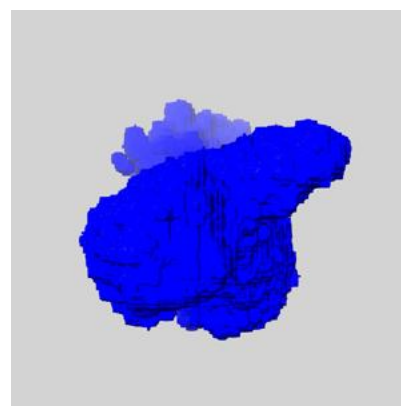
6.6.1 emd_65777_msk_1.map [i](#)



X



Y

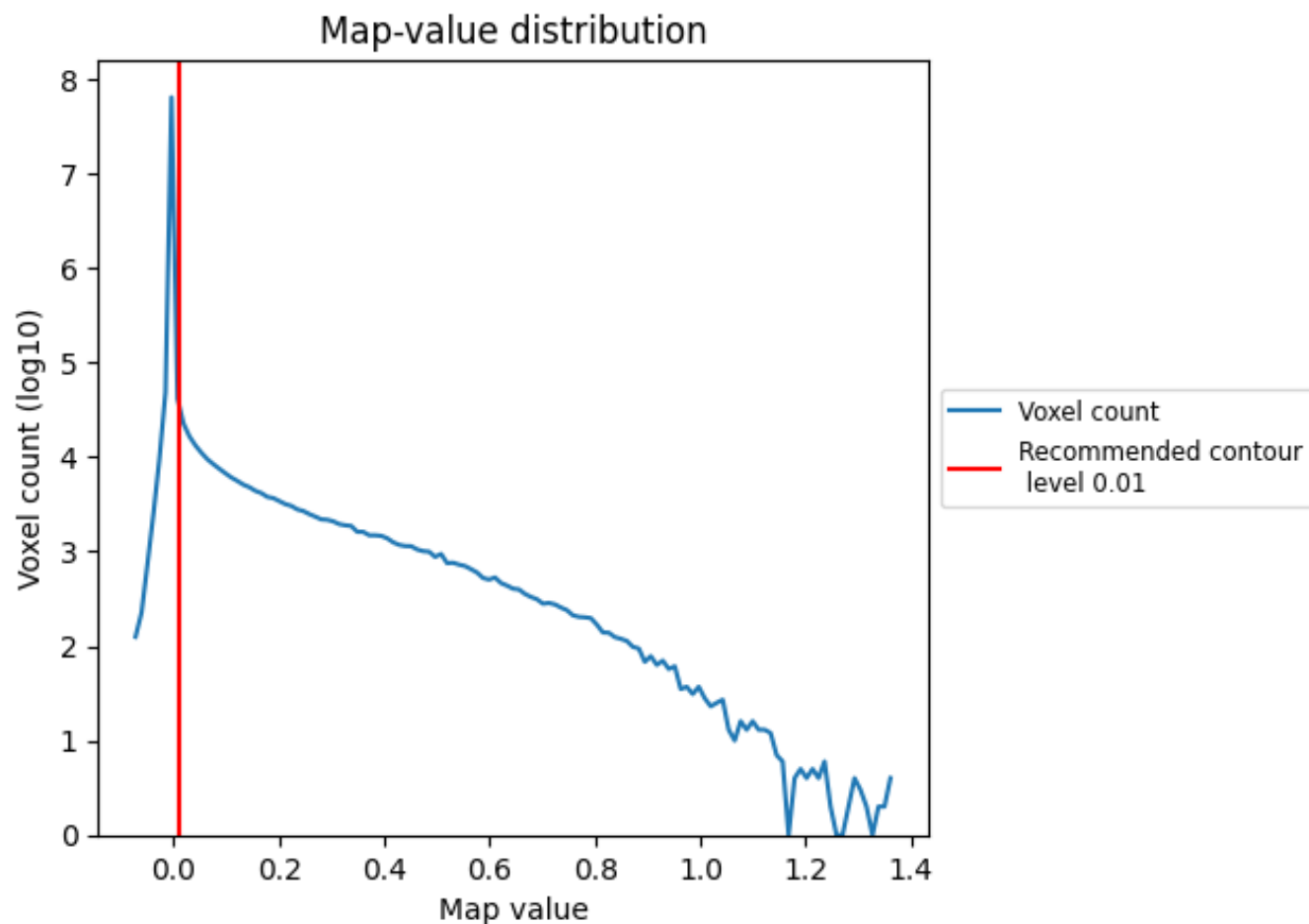


Z

7 Map analysis [i](#)

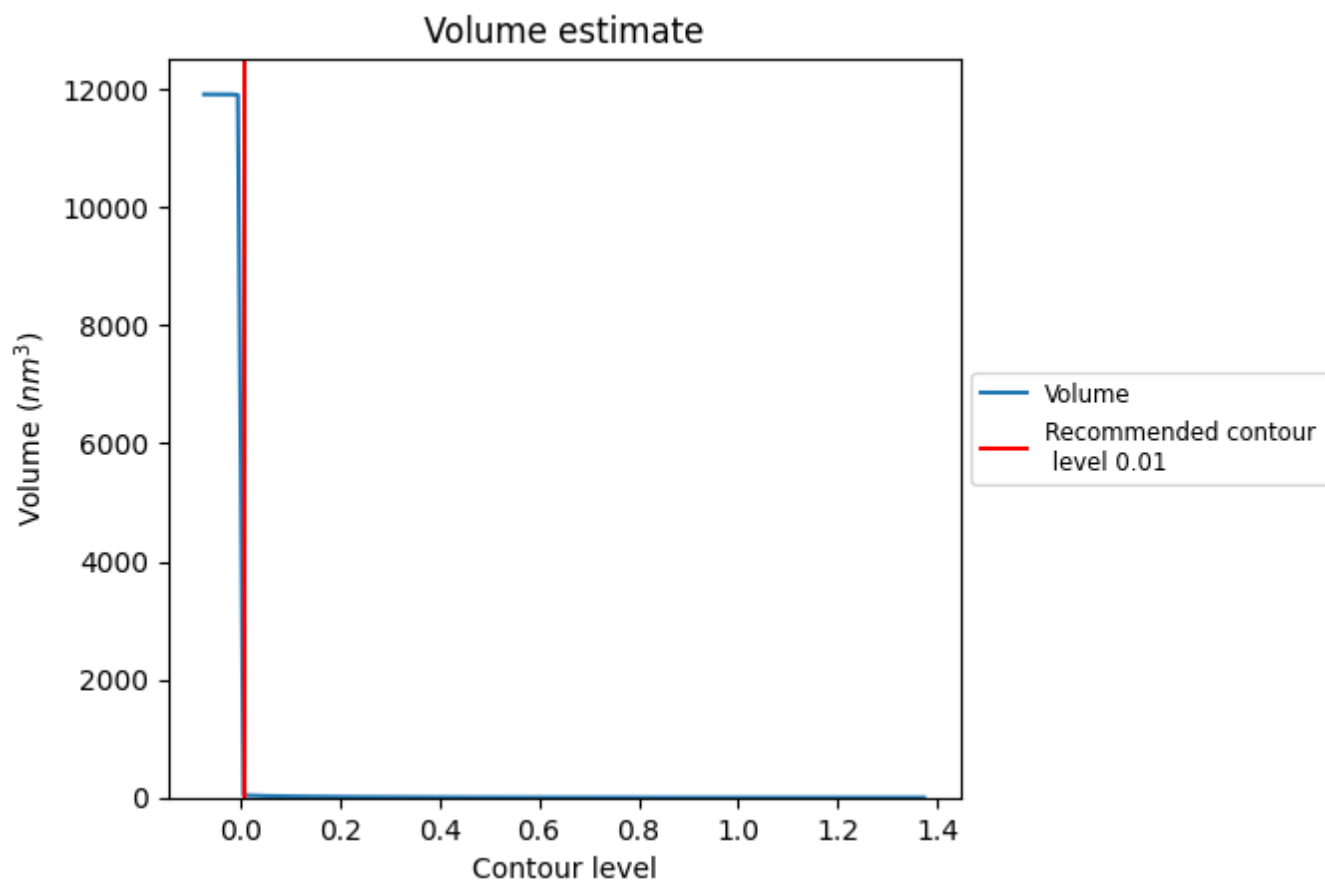
This section contains the results of statistical analysis of the map.

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.

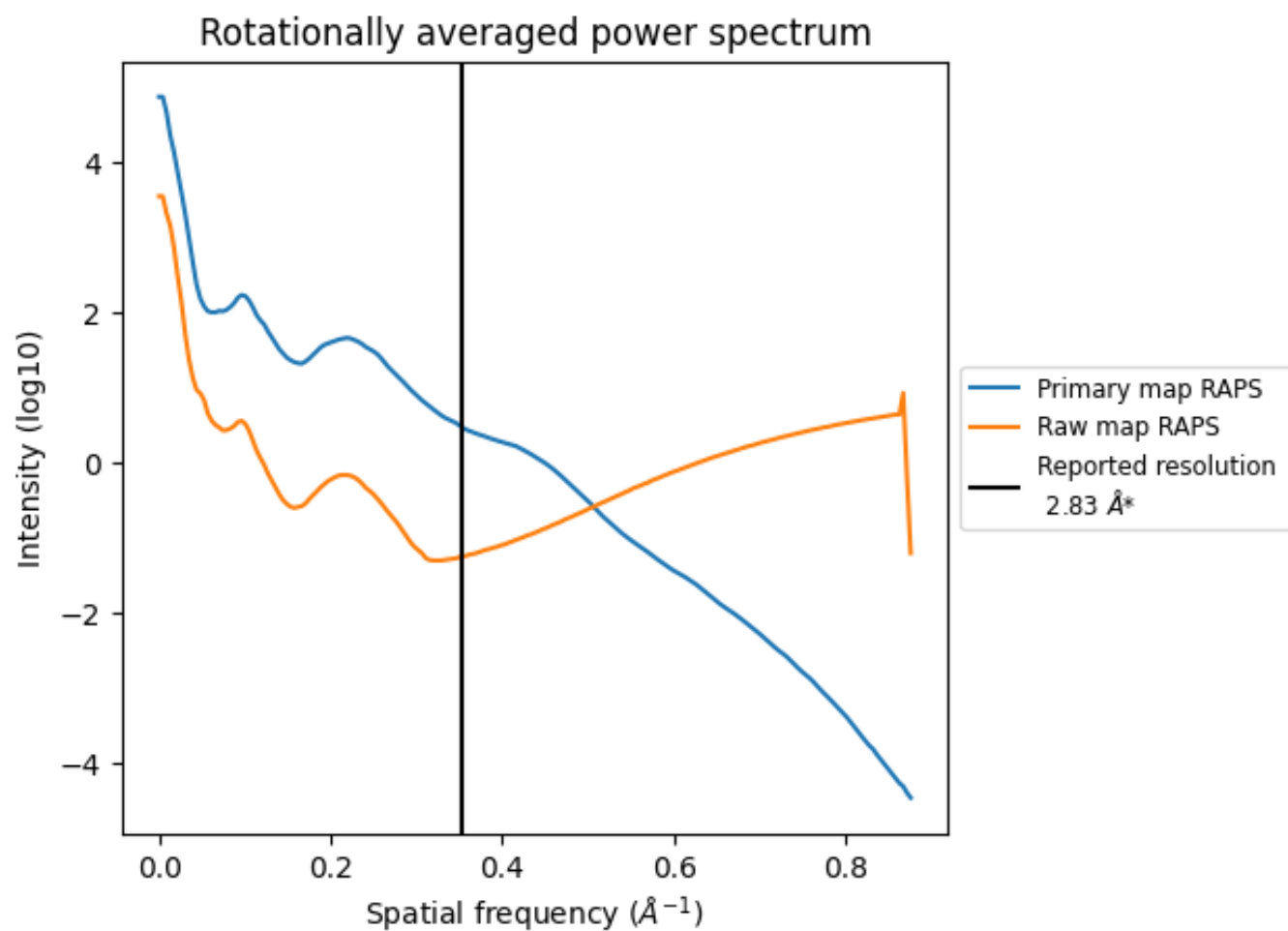
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 43 nm^3 ; this corresponds to an approximate mass of 39 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 ⓘ

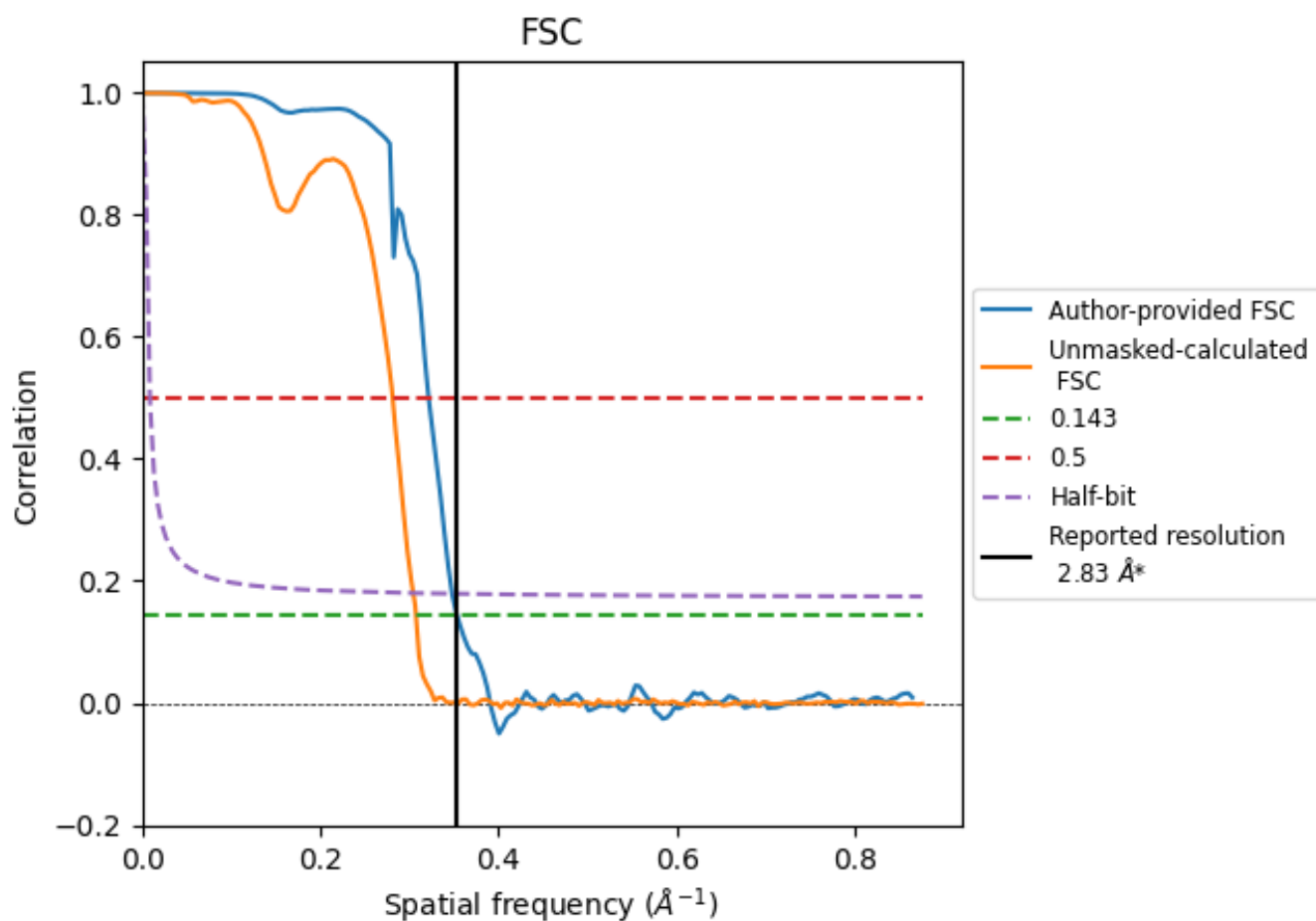


*Reported resolution corresponds to spatial frequency of $0.353 \text{ \AA}^{-1}$

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 $0.353 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

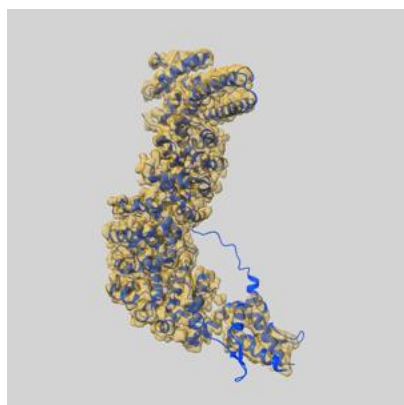
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.83	-	-
Author-provided FSC curve	2.83	3.11	2.87
Unmasked-calculated*	3.25	3.56	3.29

*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 3.25 differs from the reported value 2.83 by more than 10 %

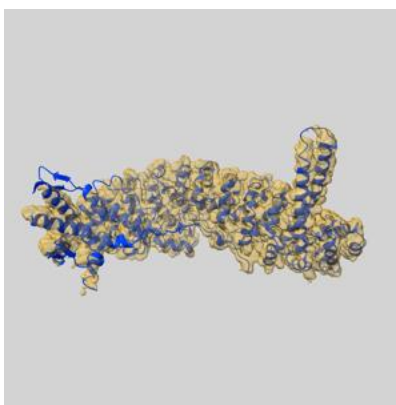
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-65777 and PDB model 9W9H. Per-residue inclusion information can be found in [section 3](#) on [page 4](#).

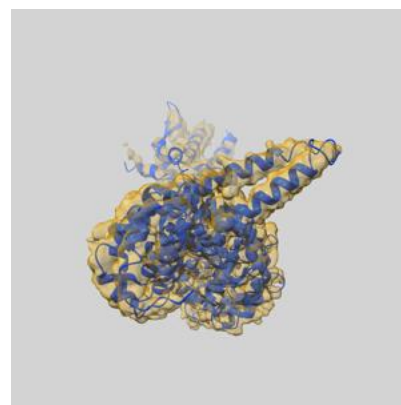
9.1 Map-model overlay [i](#)



X



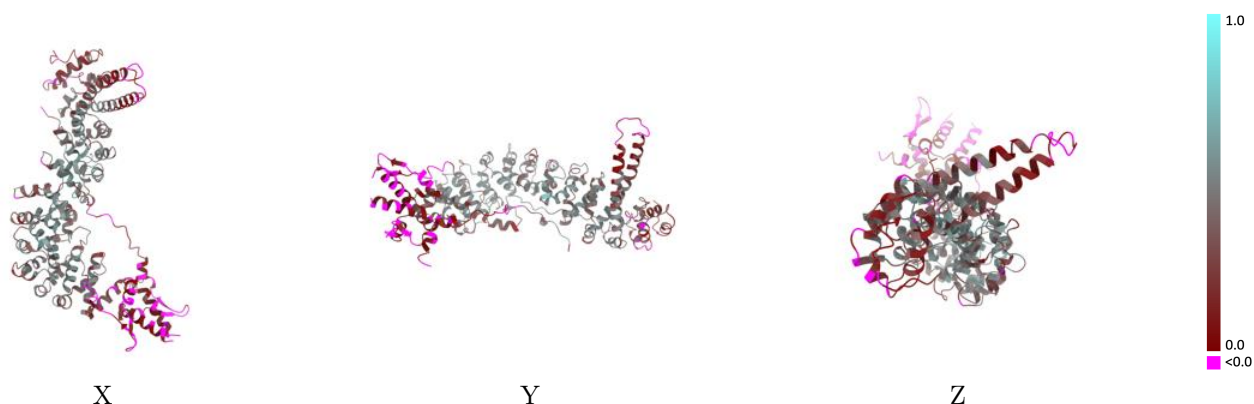
Y



Z

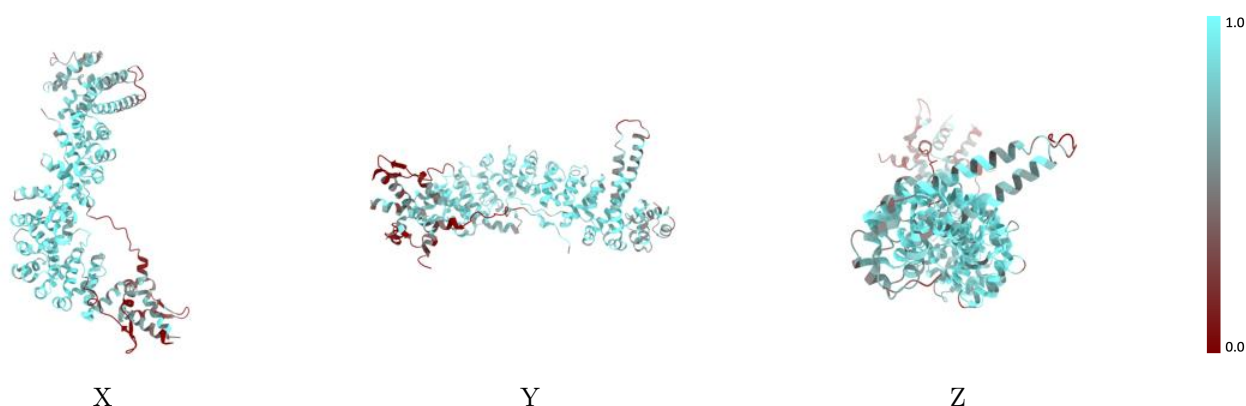
The images above show the 3D surface view of the map at the recommended contour level 0.01 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



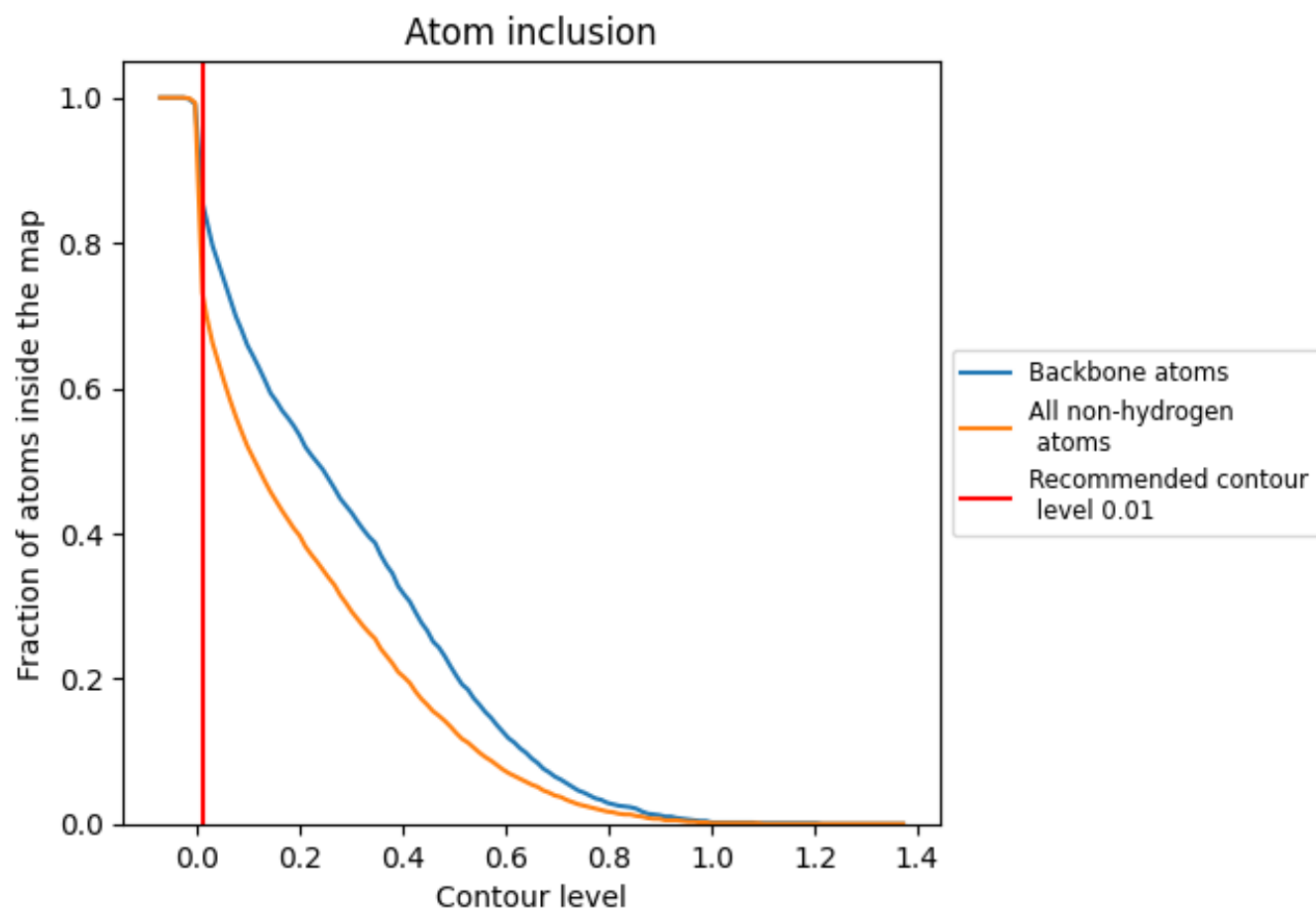
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.01).

9.4 Atom inclusion [i](#)



At the recommended contour level, 86% of all backbone atoms, 73% 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 (0.01) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7310	0.3160
A	0.3720	0.1080
B	0.5470	0.2070
C	0.8170	0.3670

