Full wwPDB EM Validation Report

May 16, 2024 – 11:32 AM EDT

PDB ID	:	9BKK
EMDB ID	:	EMD-44643
Title	:	Cholecystokinin 1 receptor (CCK1R) sterol 7M mutant, Gq chimera (mGsqi) complex
Authors	:	Harikumar, K.G.; Zhao, P.; Cary, B.P.; Xu, X.; Desai, A.J.; Mobbs, J.I.; Toufaily, C.; Furness, S.G.B.; Christopoulos, A.; Belousoff, M.J.; Wootten, D.; Sexton, P.M.; Miller, L.J.
Deposited on	:	2024-04-29
Resolution	:	2.51 Å(reported)
Based on initial model	:	7MBY

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 (i) 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 (i)) were used in the production of this report:

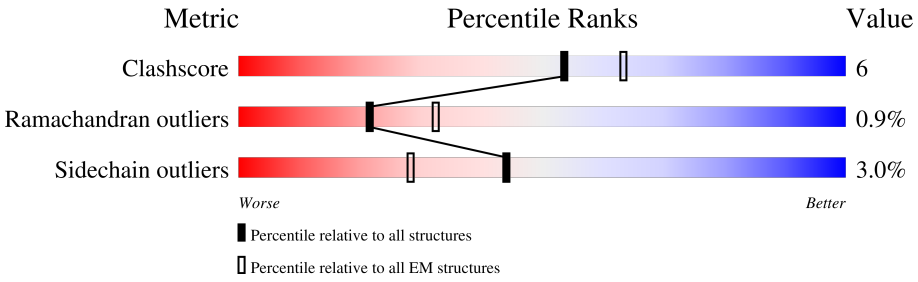
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.51 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	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	253	27% 69% 9% · 20%
2	B	340	20% 88% 10% ·
3	G	71	61% 70% 10% 20%
4	P	9	56% 56% 44%
5	R	427	33% 58% 8% 34%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 6809 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 Guanine nucleotide-binding protein G(s) subunit alpha isoforms XLas.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	203	1599	1024	283	285	7	0	0

There are 98 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	HIS	-	expression tag	UNP Q5JWF2
A	2	HIS	-	expression tag	UNP Q5JWF2
A	3	HIS	-	expression tag	UNP Q5JWF2
A	4	HIS	-	expression tag	UNP Q5JWF2
A	5	HIS	-	expression tag	UNP Q5JWF2
A	6	HIS	-	expression tag	UNP Q5JWF2
A	7	HIS	-	expression tag	UNP Q5JWF2
A	8	HIS	-	expression tag	UNP Q5JWF2
A	9	GLY	-	expression tag	UNP Q5JWF2
A	10	CYS	-	expression tag	UNP Q5JWF2
A	11	THR	-	expression tag	UNP Q5JWF2
A	12	LEU	-	expression tag	UNP Q5JWF2
A	13	SER	-	expression tag	UNP Q5JWF2
A	14	ALA	-	expression tag	UNP Q5JWF2
A	15	GLU	-	expression tag	UNP Q5JWF2
A	16	ASP	-	expression tag	UNP Q5JWF2
A	17	LYS	-	expression tag	UNP Q5JWF2
A	18	ALA	-	expression tag	UNP Q5JWF2
A	19	ALA	-	expression tag	UNP Q5JWF2
A	20	VAL	-	expression tag	UNP Q5JWF2
A	21	GLU	-	expression tag	UNP Q5JWF2
A	22	ARG	-	expression tag	UNP Q5JWF2
A	23	SER	-	expression tag	UNP Q5JWF2
A	24	LYS	-	expression tag	UNP Q5JWF2
A	25	MET	-	expression tag	UNP Q5JWF2
A	26	ILE	-	expression tag	UNP Q5JWF2
A	27	ASP	-	expression tag	UNP Q5JWF2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	28	ARG	-	expression tag	UNP Q5JWF2
A	29	ASN	-	expression tag	UNP Q5JWF2
A	30	LEU	-	expression tag	UNP Q5JWF2
A	31	ARG	-	expression tag	UNP Q5JWF2
A	32	GLU	-	expression tag	UNP Q5JWF2
A	33	ASP	-	expression tag	UNP Q5JWF2
A	34	GLY	-	expression tag	UNP Q5JWF2
A	35	GLU	-	expression tag	UNP Q5JWF2
A	36	LYS	-	expression tag	UNP Q5JWF2
A	37	ALA	-	expression tag	UNP Q5JWF2
A	38	ARG	-	expression tag	UNP Q5JWF2
A	39	ARG	-	expression tag	UNP Q5JWF2
A	40	THR	-	expression tag	UNP Q5JWF2
A	41	LEU	-	expression tag	UNP Q5JWF2
A	42	ARG	-	expression tag	UNP Q5JWF2
A	43	LEU	-	expression tag	UNP Q5JWF2
A	44	LEU	-	expression tag	UNP Q5JWF2
A	45	LEU	-	expression tag	UNP Q5JWF2
A	46	LEU	-	expression tag	UNP Q5JWF2
A	47	GLY	-	expression tag	UNP Q5JWF2
A	48	ALA	-	expression tag	UNP Q5JWF2
A	49	ASP	-	expression tag	UNP Q5JWF2
A	50	ASN	-	expression tag	UNP Q5JWF2
A	51	SER	-	expression tag	UNP Q5JWF2
A	52	GLY	-	expression tag	UNP Q5JWF2
A	53	LYS	-	expression tag	UNP Q5JWF2
A	54	SER	-	expression tag	UNP Q5JWF2
A	55	THR	-	expression tag	UNP Q5JWF2
A	56	ILE	-	expression tag	UNP Q5JWF2
A	57	VAL	-	expression tag	UNP Q5JWF2
A	58	LYS	-	expression tag	UNP Q5JWF2
A	59	GLN	-	expression tag	UNP Q5JWF2
A	191	MET	-	expression tag	UNP Q5JWF2
A	192	ARG	-	expression tag	UNP Q5JWF2
A	193	ILE	-	expression tag	UNP Q5JWF2
A	194	LEU	-	expression tag	UNP Q5JWF2
A	195	HIS	-	expression tag	UNP Q5JWF2
A	196	GLY	-	expression tag	UNP Q5JWF2
A	197	GLY	-	expression tag	UNP Q5JWF2
A	198	SER	-	expression tag	UNP Q5JWF2
A	199	GLY	-	expression tag	UNP Q5JWF2
A	200	GLY	-	expression tag	UNP Q5JWF2

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Chain	Residue	Modelled	Actual	Comment	Reference
A	201	SER	-	expression tag	UNP Q5JWF2
A	202	GLY	-	expression tag	UNP Q5JWF2
A	203	GLY	-	expression tag	UNP Q5JWF2
A	249	ASP	ALA	engineered mutation	UNP Q5JWF2
A	252	ASP	SER	engineered mutation	UNP Q5JWF2
A	?	-	MET	deletion	UNP Q5JWF2
A	?	-	VAL	deletion	UNP Q5JWF2
A	?	-	ILE	deletion	UNP Q5JWF2
A	?	-	ARG	deletion	UNP Q5JWF2
A	?	-	GLU	deletion	UNP Q5JWF2
A	?	-	ASP	deletion	UNP Q5JWF2
A	?	-	ASN	deletion	UNP Q5JWF2
A	?	-	GLN	deletion	UNP Q5JWF2
A	?	-	THR	deletion	UNP Q5JWF2
A	?	-	ASN	deletion	UNP Q5JWF2
A	272	ASP	LEU	engineered mutation	UNP Q5JWF2
A	343	LYS	ASP	engineered mutation	UNP Q5JWF2
A	346	VAL	LEU	engineered mutation	UNP Q5JWF2
A	347	ASP	ARG	engineered mutation	UNP Q5JWF2
A	358	ILE	TYR	engineered mutation	UNP Q5JWF2
A	372	ALA	ILE	engineered mutation	UNP Q5JWF2
A	375	ILE	VAL	engineered mutation	UNP Q5JWF2
A	380	LYS	ARG	engineered mutation	UNP Q5JWF2
A	384	LEU	GLN	engineered mutation	UNP Q5JWF2
A	385	GLN	ARG	engineered mutation	UNP Q5JWF2
A	387	ASN	HIS	engineered mutation	UNP Q5JWF2
A	390	GLU	GLN	engineered mutation	UNP Q5JWF2
A	392	ASN	GLU	engineered mutation	UNP Q5JWF2
A	394	VAL	LEU	engineered mutation	UNP Q5JWF2

- Molecule 2 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	339	Total	C	N	O	S	0	0
			2497	1554	436	486	21		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	GLN	-	expression tag	UNP P62873

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	G	57	Total	C	N	O	S	0	0
			407	256	70	78	3		

- Molecule 4 is a protein called Cholecystokinin-8.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	P	9	Total	C	N	O	S	0	1
			78	49	10	16	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
P	9	NH2	-	amidation	UNP P06307

- Molecule 5 is a protein called Cholecystokinin receptor type A.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	R	283	Total	C	N	O	S	0	0
			2228	1479	357	370	22		

There are 7 discrepancies between the modelled and reference sequences:

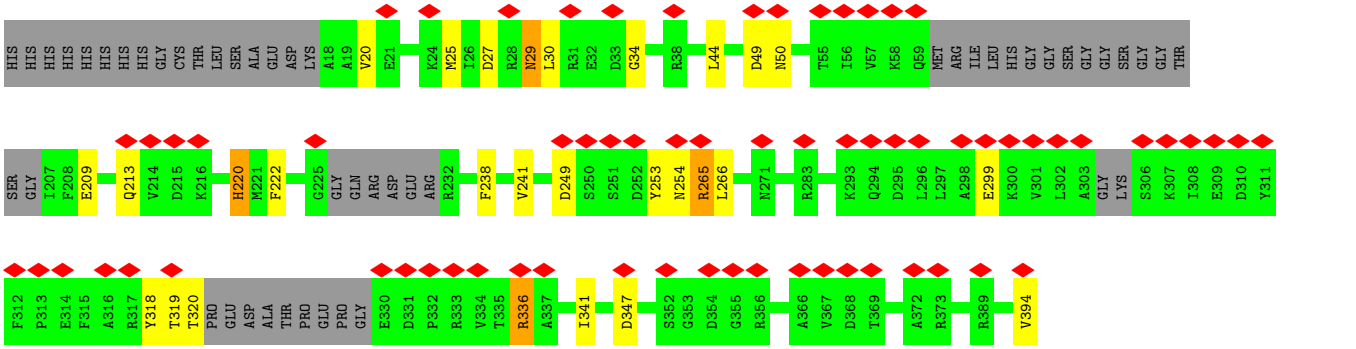
Chain	Residue	Modelled	Actual	Comment	Reference
R	130	LEU	PHE	engineered mutation	UNP P32238
R	136	ALA	SER	engineered mutation	UNP P32238
R	141	SER	GLY	engineered mutation	UNP P32238
R	216	LEU	ILE	engineered mutation	UNP P32238
R	219	PHE	LEU	engineered mutation	UNP P32238
R	223	VAL	ILE	engineered mutation	UNP P32238
R	226	ALA	MET	engineered mutation	UNP P32238

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.

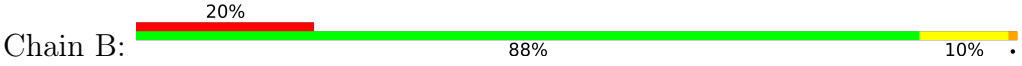
• Molecule 1: Guanine nucleotide-binding protein G(s) subunit alpha isoforms XLas

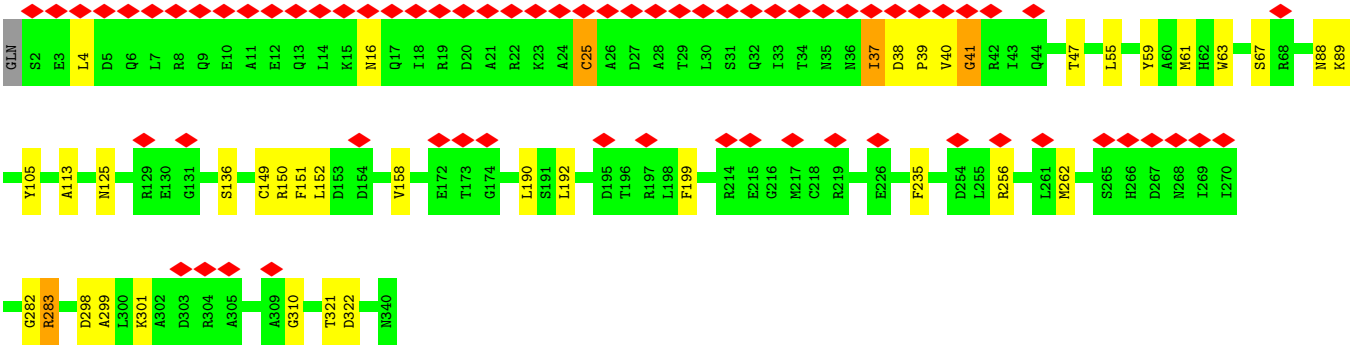
Chain A:



• Molecule 2: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1

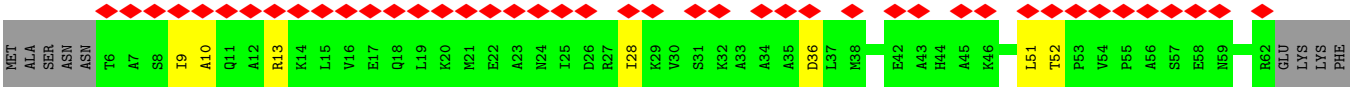
Chain B:





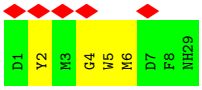
• Molecule 3: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2

Chain G:



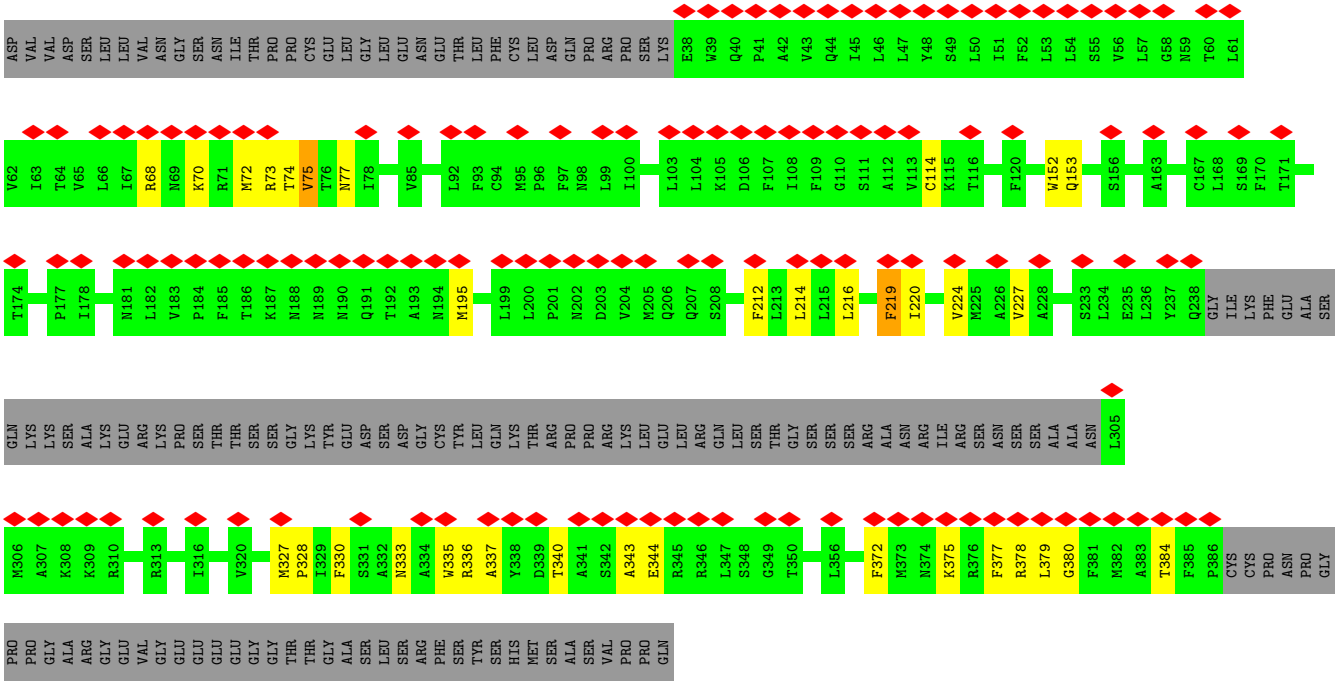
• Molecule 4: Cholecystokinin-8

Chain P:



• Molecule 5: Cholecystokinin receptor type A

Chain R:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	279231	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	60	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	5.222	Depositor
Minimum map value	-3.132	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.100	Depositor
Recommended contour level	0.75	Depositor
Map size (Å)	217.6, 217.6, 217.6	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.85, 0.85, 0.85	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: TYS, NH2

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	0.62	0/1626	0.90	0/2192
2	B	0.59	0/2544	0.93	0/3463
3	G	0.55	0/413	0.78	0/564
4	P	0.72	0/62	0.72	0/80
5	R	0.63	0/2282	0.83	0/3109
All	All	0.61	0/6927	0.88	0/9408

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

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	1599	0	1535	25	0
2	B	2497	0	2339	21	0
3	G	407	0	392	6	0
4	P	78	0	58	7	0
5	R	2228	0	2305	28	0
All	All	6809	0	6629	74	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 6.

All (74) 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)
5:R:375:LYS:HA	5:R:378:ARG:HB2	1.40	1.01
5:R:214:LEU:HD13	5:R:330:PHE:HB3	1.64	0.80
1:A:266:LEU:HD21	1:A:341:ILE:HD12	1.70	0.73
2:B:158:VAL:HG12	2:B:190:LEU:HD11	1.70	0.71
5:R:68:ARG:HD3	5:R:384:THR:HG23	1.75	0.69
1:A:27:ASP:HA	1:A:30:LEU:HG	1.75	0.68
5:R:375:LYS:HA	5:R:378:ARG:CB	2.22	0.64
4:P:2:TYS:CD1	5:R:195:MET:HG2	2.31	0.61
5:R:214:LEU:HD12	5:R:214:LEU:O	2.01	0.60
2:B:192:LEU:HD23	2:B:199:PHE:HB3	1.83	0.60
1:A:34:GLY:HA3	2:B:55:LEU:HD13	1.85	0.58
4:P:5:TRP:HD1	4:P:6:MET:O	1.86	0.58
3:G:9:ILE:O	3:G:13:ARG:HG3	2.03	0.58
4:P:4:GLY:HA2	5:R:344:GLU:HG2	1.86	0.57
2:B:125:ASN:HB2	2:B:136:SER:OG	2.04	0.57
4:P:5:TRP:O	5:R:336:ARG:NH2	2.39	0.56
3:G:10:ALA:HA	3:G:13:ARG:NH2	2.21	0.56
1:A:34:GLY:HA3	2:B:55:LEU:CD1	2.35	0.56
1:A:50:ASN:O	1:A:249:ASP:HB2	2.06	0.55
1:A:29:ASN:HD22	1:A:29:ASN:N	2.04	0.55
1:A:249:ASP:H	1:A:265:ARG:NH2	2.04	0.55
5:R:340:THR:O	5:R:344:GLU:HG3	2.07	0.55
1:A:20:VAL:HG22	2:B:88:ASN:HD21	1.72	0.54
2:B:4:LEU:HB2	3:G:9:ILE:HG12	1.89	0.54
1:A:30:LEU:HD21	2:B:89:LYS:HE2	1.90	0.54
1:A:249:ASP:H	1:A:265:ARG:HH22	1.55	0.53
2:B:63:TRP:CE2	2:B:321:THR:HG22	2.43	0.53
4:P:5:TRP:HE1	5:R:333:ASN:ND2	2.08	0.52
1:A:209:GLU:HB2	1:A:220:HIS:HE1	1.73	0.52
1:A:25:MET:O	1:A:29:ASN:ND2	2.43	0.52
1:A:209:GLU:HB2	1:A:220:HIS:CE1	2.45	0.52
5:R:68:ARG:CD	5:R:384:THR:HG23	2.38	0.52
5:R:72:MET:SD	5:R:380:GLY:HA3	2.50	0.51
2:B:39:PRO:C	2:B:41:GLY:H	2.14	0.51
2:B:158:VAL:CG1	2:B:190:LEU:HD11	2.39	0.51
2:B:235:PHE:HE1	2:B:282:GLY:O	1.94	0.51
1:A:319:THR:O	1:A:320:THR:C	2.49	0.50
1:A:266:LEU:HD21	1:A:341:ILE:CD1	2.40	0.50
1:A:318:TYR:HB3	1:A:336:ARG:HD2	1.95	0.48
1:A:44:LEU:HD12	1:A:222:PHE:O	2.12	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:R:216:LEU:O	5:R:216:LEU:HG	2.14	0.48
2:B:113:ALA:HB2	2:B:151:PHE:CZ	2.49	0.48
1:A:27:ASP:HA	1:A:30:LEU:CG	2.43	0.48
5:R:74:THR:O	5:R:77:ASN:N	2.47	0.47
3:G:51:LEU:HD12	3:G:52:THR:N	2.29	0.47
1:A:318:TYR:O	1:A:336:ARG:HD3	2.15	0.46
2:B:37:ILE:HD11	2:B:301:LYS:CG	2.45	0.46
5:R:70:LYS:HA	5:R:73:ARG:NE	2.30	0.46
2:B:25:CYS:SG	3:G:28:ILE:O	2.74	0.46
1:A:49:ASP:O	1:A:50:ASN:CB	2.64	0.45
2:B:283:ARG:NH2	2:B:298:ASP:OD2	2.49	0.45
5:R:152:TRP:CZ3	5:R:153:GLN:HG2	2.52	0.45
5:R:327:MET:HB3	5:R:328:PRO:HD3	1.98	0.45
5:R:224:VAL:HA	5:R:227:VAL:HG12	1.99	0.44
5:R:375:LYS:O	5:R:379:LEU:HG	2.17	0.44
4:P:2:TYS:HA	5:R:195:MET:SD	2.57	0.44
4:P:5:TRP:CZ2	5:R:336:ARG:HB3	2.52	0.44
5:R:335:TRP:CZ3	5:R:343:ALA:HA	2.53	0.44
2:B:37:ILE:HD11	2:B:301:LYS:HG3	1.99	0.44
1:A:253:TYR:HA	1:A:266:LEU:HB2	2.00	0.43
2:B:149:CYS:O	2:B:150:ARG:HG2	2.18	0.43
5:R:375:LYS:CA	5:R:378:ARG:HB2	2.30	0.42
5:R:68:ARG:NE	5:R:384:THR:O	2.52	0.42
5:R:336:ARG:HG3	5:R:337:ALA:N	2.34	0.42
1:A:266:LEU:HD12	1:A:266:LEU:HA	1.78	0.42
2:B:152:LEU:HD23	2:B:192:LEU:HD13	2.02	0.41
5:R:74:THR:O	5:R:75:VAL:C	2.59	0.41
2:B:256:ARG:NH1	3:G:36:ASP:OD2	2.52	0.41
5:R:219:PHE:HD2	5:R:220:ILE:HG12	1.85	0.41
1:A:238:PHE:O	1:A:241:VAL:HG22	2.21	0.41
5:R:372:PHE:O	5:R:378:ARG:HD3	2.21	0.40
1:A:265:ARG:H	1:A:265:ARG:HG3	1.78	0.40
2:B:37:ILE:HG13	2:B:38:ASP:N	2.35	0.40
1:A:49:ASP:O	1:A:265:ARG:NH1	2.54	0.40

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	193/253 (76%)	182 (94%)	11 (6%)	0	100 100
2	B	337/340 (99%)	315 (94%)	16 (5%)	6 (2%)	8 14
3	G	55/71 (78%)	54 (98%)	1 (2%)	0	100 100
4	P	6/9 (67%)	6 (100%)	0	0	100 100
5	R	279/427 (65%)	266 (95%)	11 (4%)	2 (1%)	22 39
All	All	870/1100 (79%)	823 (95%)	39 (4%)	8 (1%)	21 31

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	37	ILE
5	R	75	VAL
2	B	40	VAL
2	B	299	ALA
2	B	310	GLY
2	B	41	GLY
2	B	67	SER
5	R	219	PHE

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	161/221 (73%)	152 (94%)	9 (6%)	21 40

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	B	256/283 (90%)	247 (96%)	9 (4%)	36 62
3	G	39/58 (67%)	39 (100%)	0	100 100
4	P	6/6 (100%)	6 (100%)	0	100 100
5	R	248/380 (65%)	245 (99%)	3 (1%)	71 88
All	All	710/948 (75%)	689 (97%)	21 (3%)	44 68

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	29	ASN
1	A	213	GLN
1	A	220	HIS
1	A	254	ASN
1	A	265	ARG
1	A	299	GLU
1	A	336	ARG
1	A	347	ASP
1	A	394	VAL
2	B	16	ASN
2	B	25	CYS
2	B	47	THR
2	B	59	TYR
2	B	61	MET
2	B	105	TYR
2	B	262	MET
2	B	283	ARG
2	B	322	ASP
5	R	114	CYS
5	R	212	PHE
5	R	377	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	29	ASN
1	A	220	HIS
2	B	88	ASN
2	B	220	GLN
5	R	131	ASN
5	R	333	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	TYS	P	2	4	15,16,17	0.63	0	18,22,24	0.95	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	TYS	P	2	4	-	5/10/11/13	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	P	2	TYS	C-CA-CB-CG
4	P	2	TYS	CZ-OH-S-O1
4	P	2	TYS	CZ-OH-S-O3
4	P	2	TYS	N-CA-CB-CG
4	P	2	TYS	CZ-OH-S-O2

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	P	2	TYS	2	0

5.5 Carbohydrates (i)

There are no monosaccharides 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.

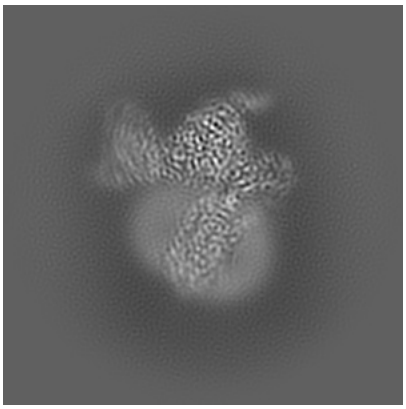
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-44643. These allow visual inspection of the internal detail of the map and identification of artifacts.

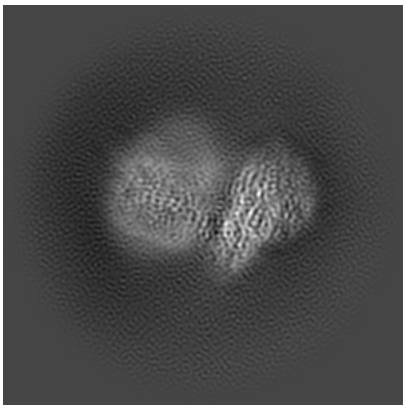
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

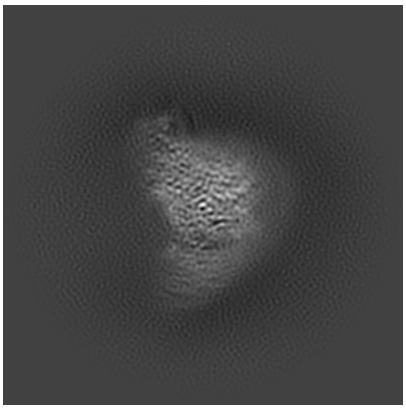
6.1.1 Primary map



X

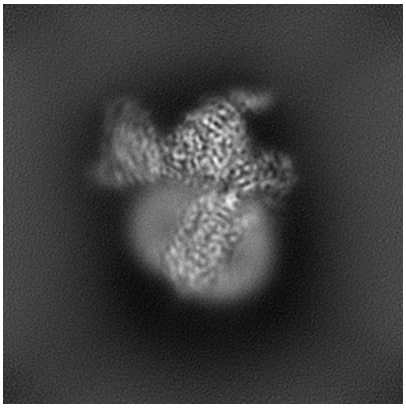


Y

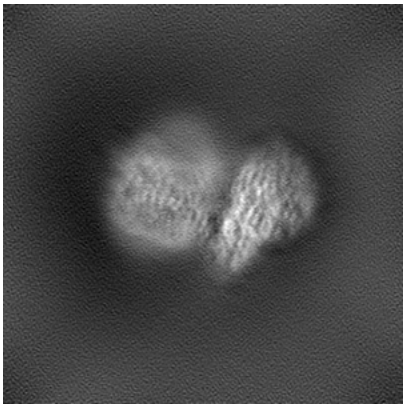


Z

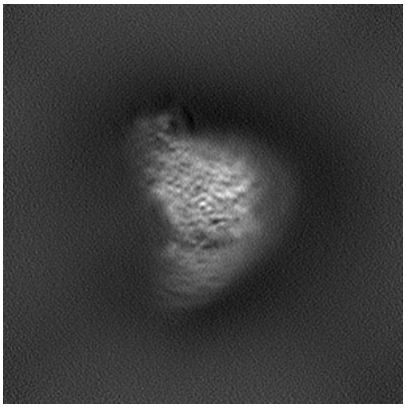
6.1.2 Raw map



X



Y

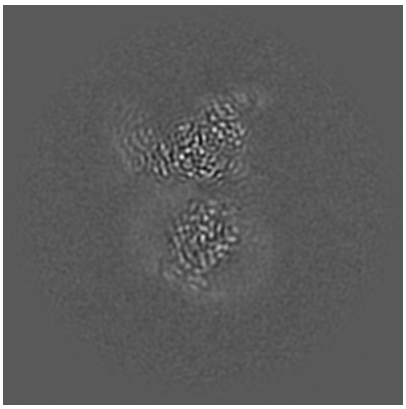


Z

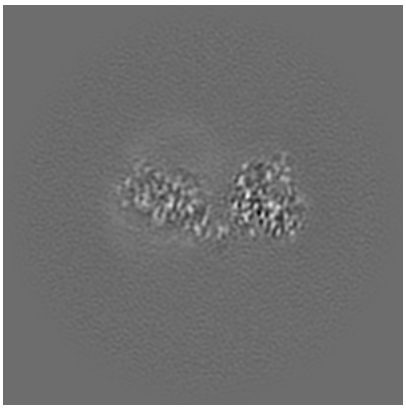
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

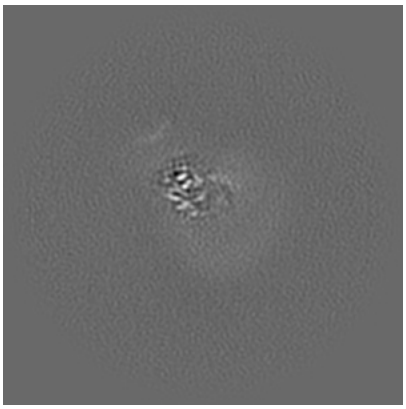
6.2.1 Primary map



X Index: 128

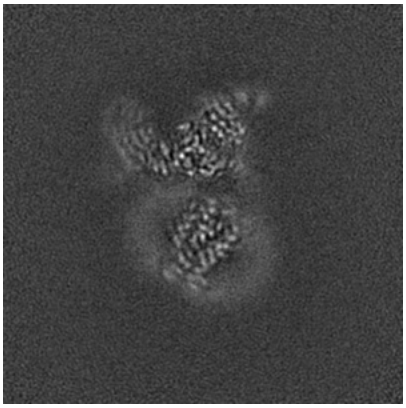


Y Index: 128

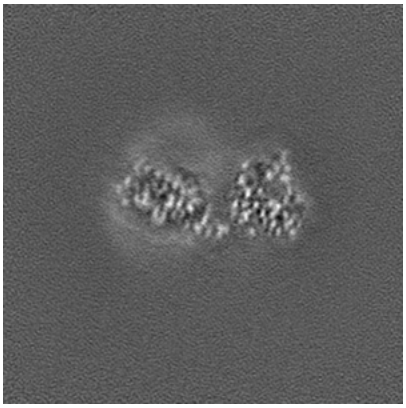


Z Index: 128

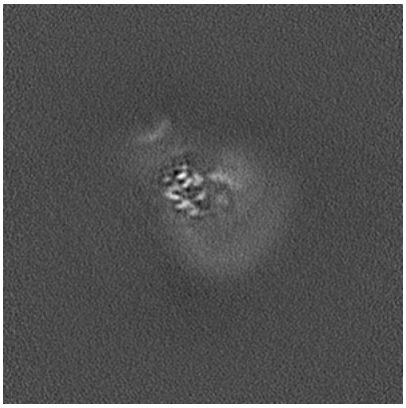
6.2.2 Raw map



X Index: 128



Y Index: 128

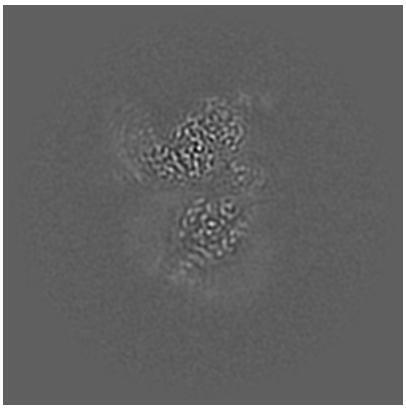


Z Index: 128

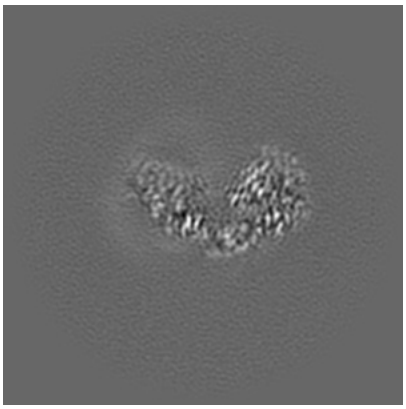
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

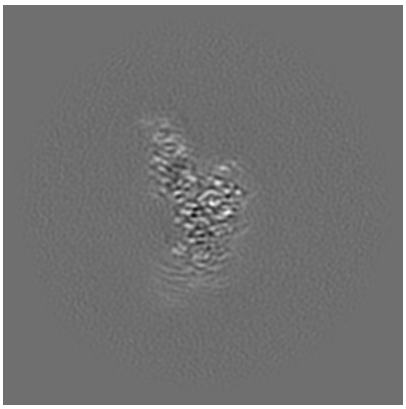
6.3.1 Primary map



X Index: 124

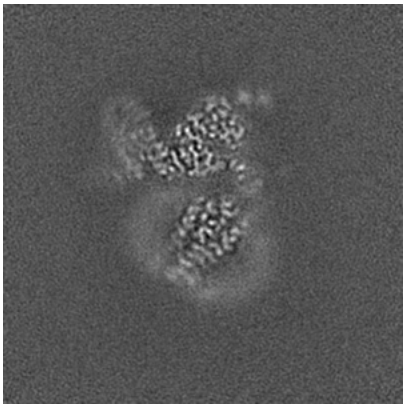


Y Index: 137

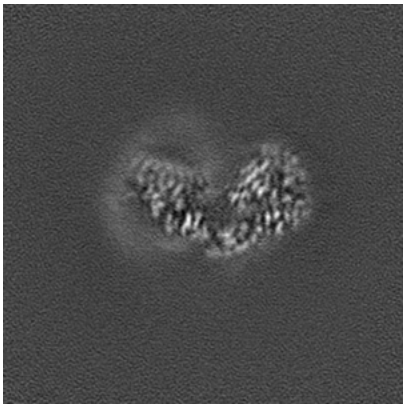


Z Index: 156

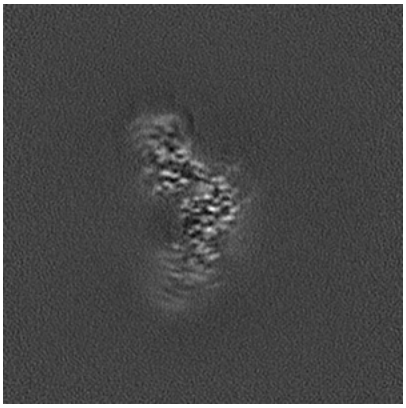
6.3.2 Raw map



X Index: 125



Y Index: 137

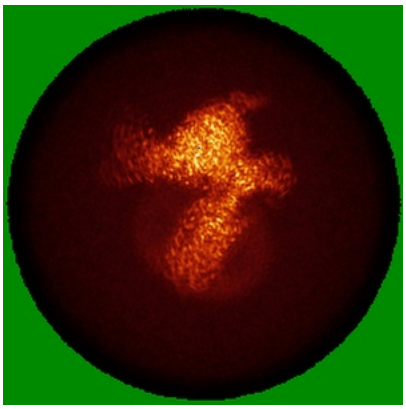


Z Index: 152

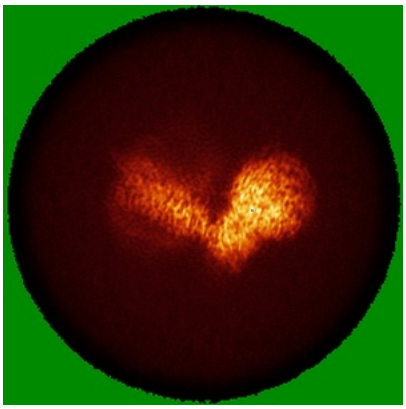
The images above show the largest variance slices of the map in three orthogonal directions.

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

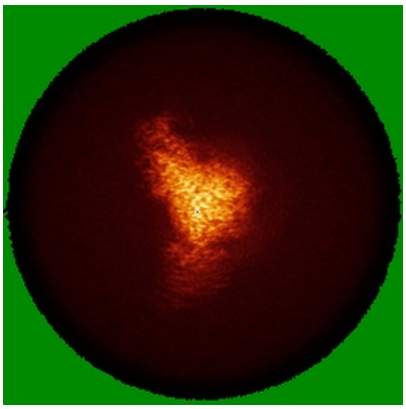
6.4.1 Primary map



X

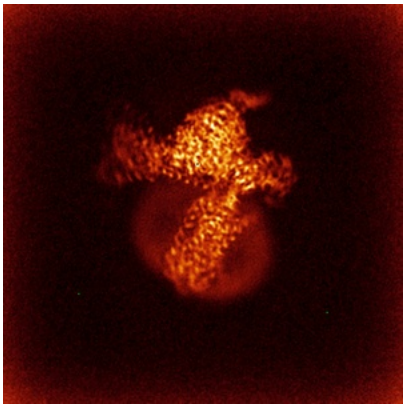


Y

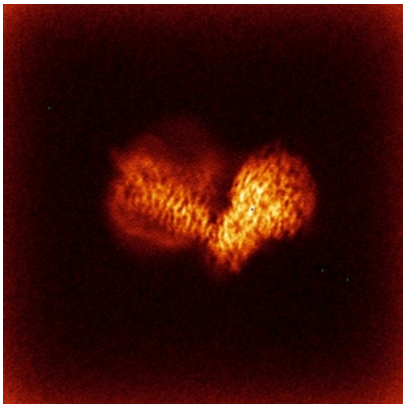


Z

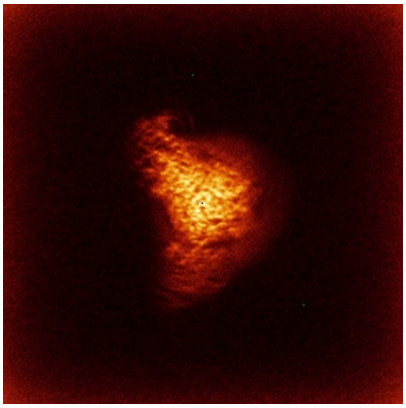
6.4.2 Raw map



X



Y

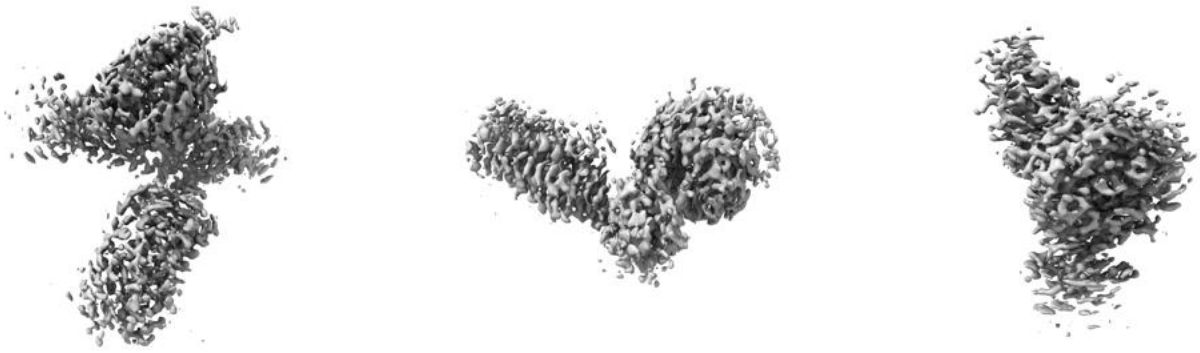


Z

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)

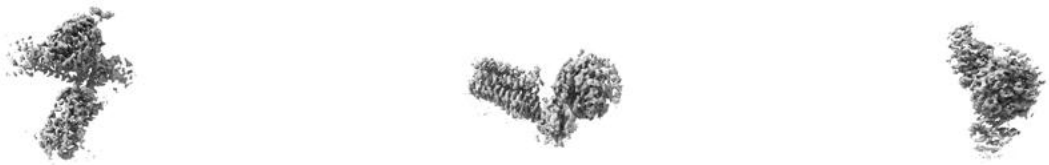
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.75. 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.

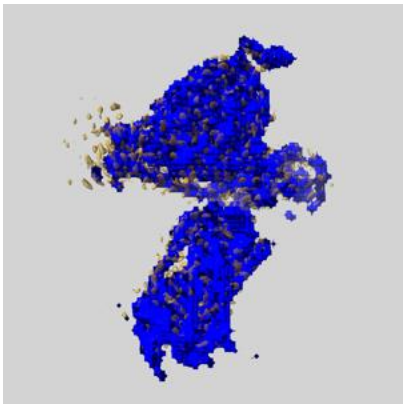
6.6 Mask visualisation (i)

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

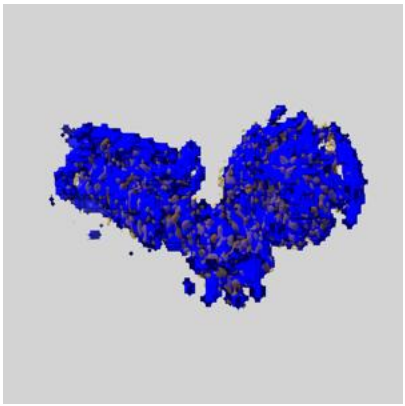
A mask typically either:

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

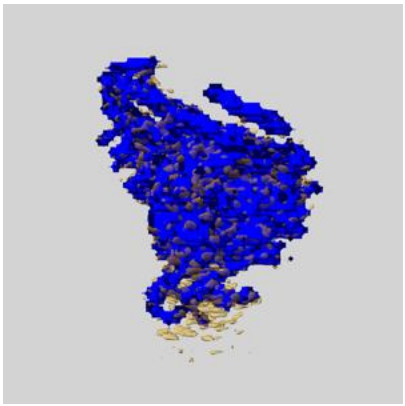
6.6.1 emd_44643_msk_1.map (i)



X



Y

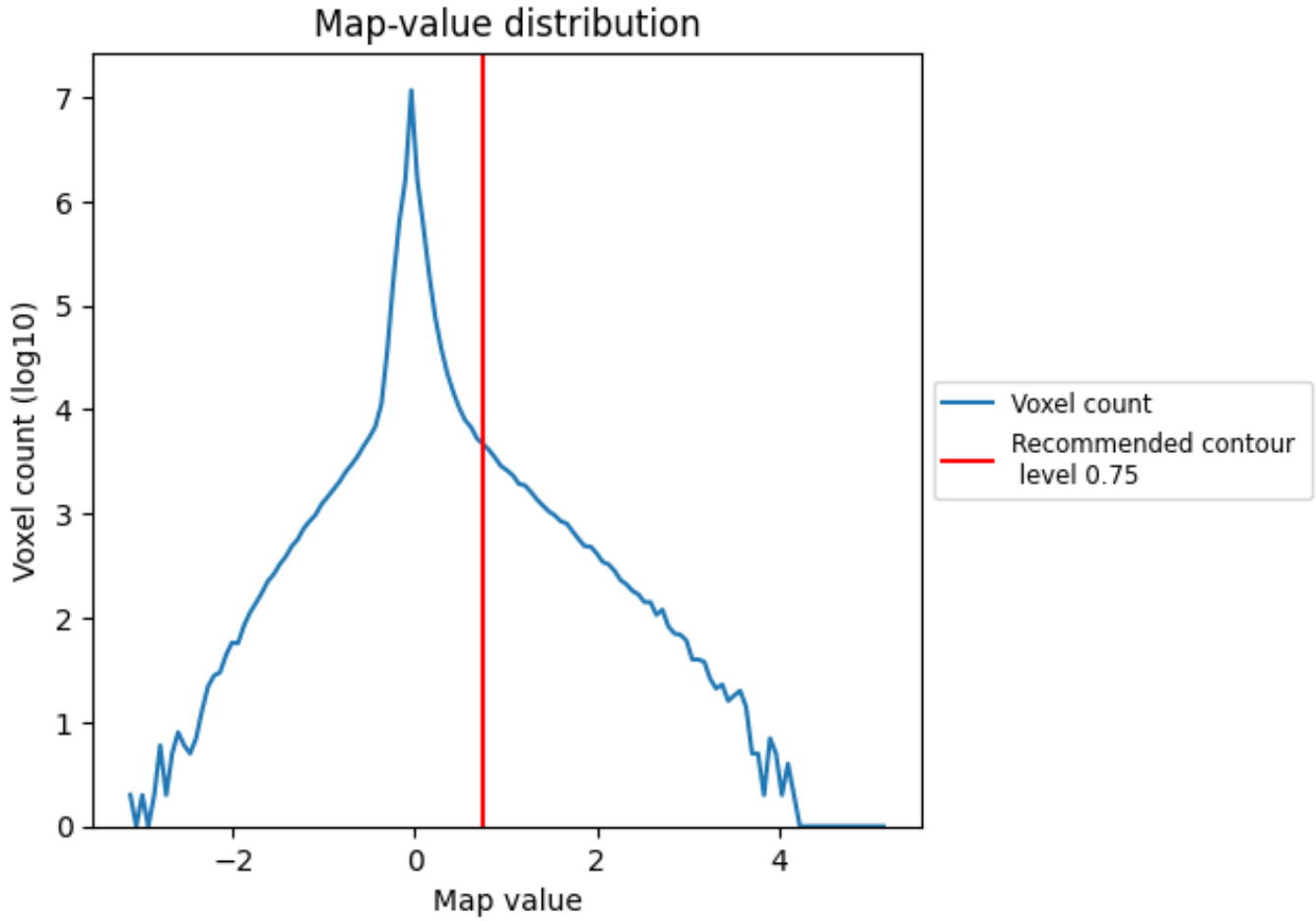


Z

7 Map analysis

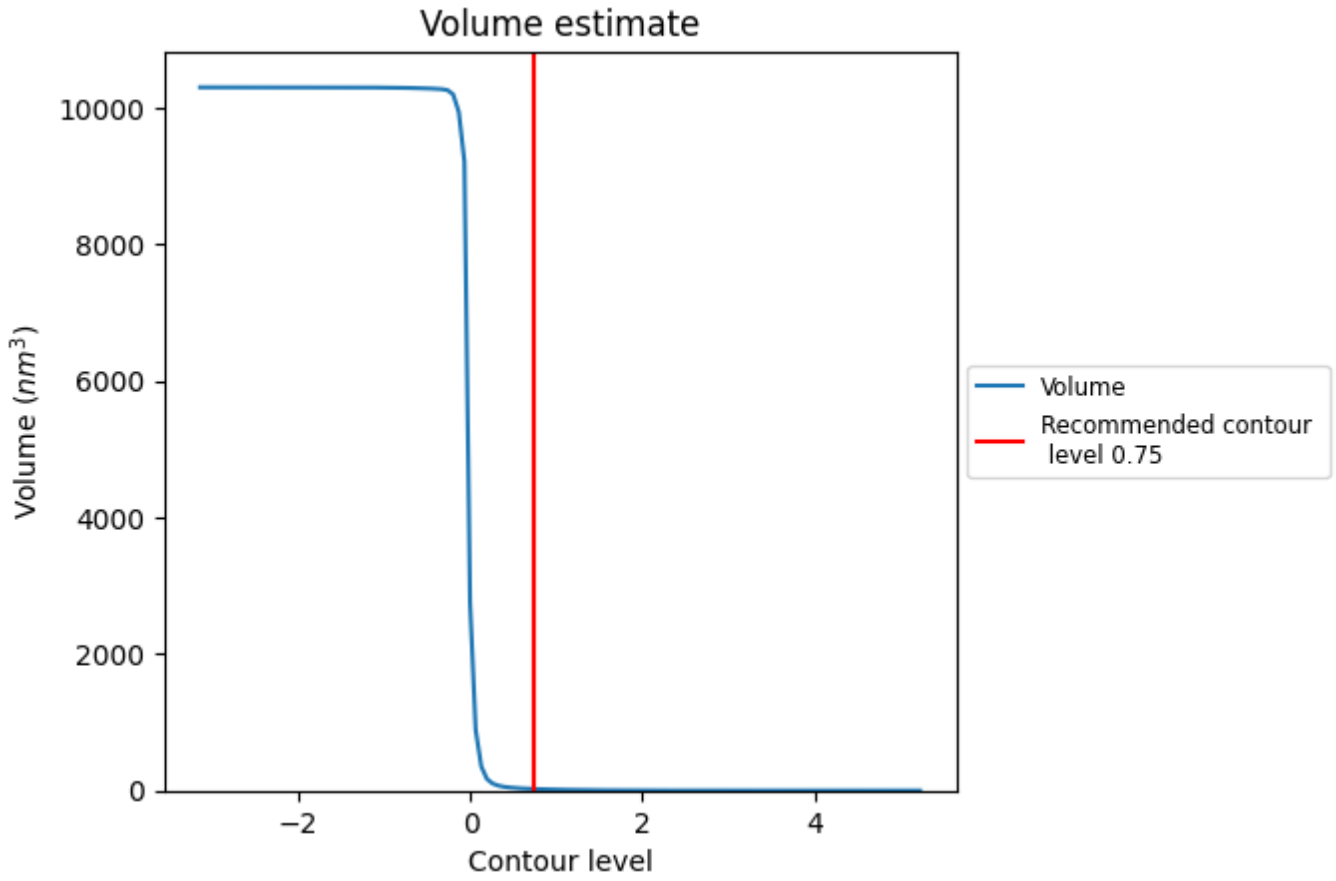
This section contains the results of statistical analysis of the map.

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.

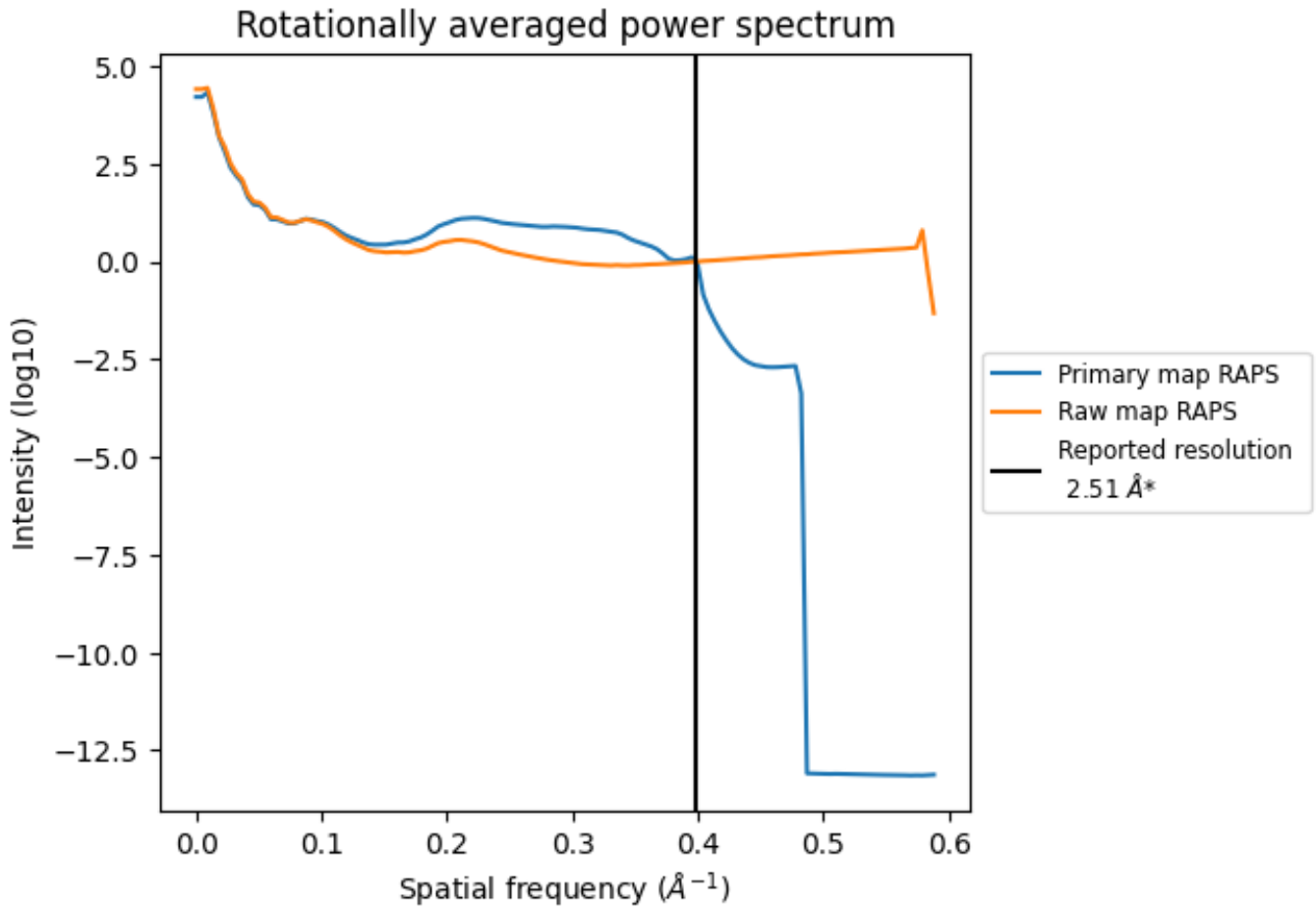
7.2 Volume estimate



The volume at the recommended contour level is 23 nm^3; this corresponds to an approximate mass of 21 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)

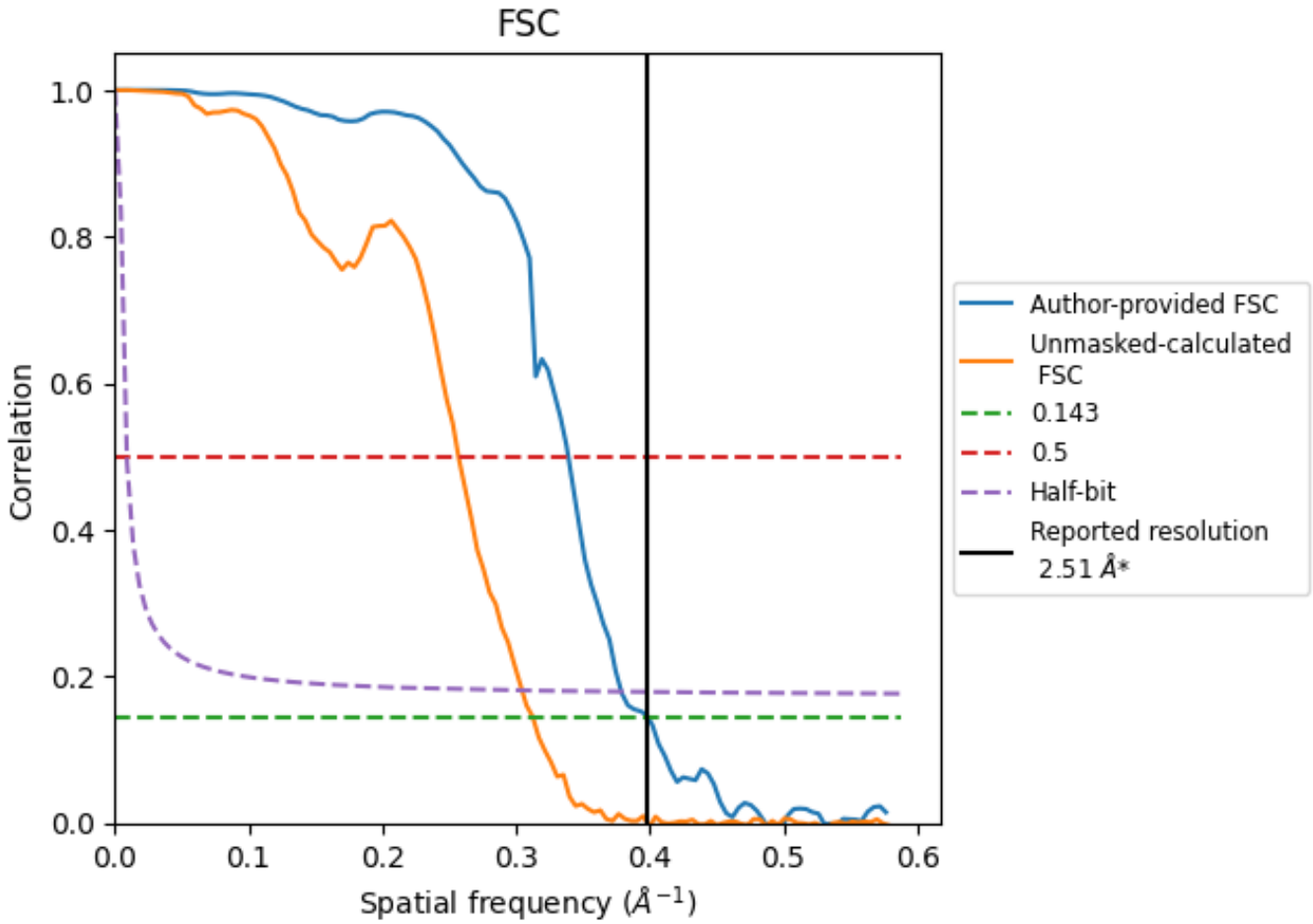


*Reported resolution corresponds to spatial frequency of 0.398 $Å^{-1}$

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.398 $Å^{-1}$

8.2 Resolution estimates (i)

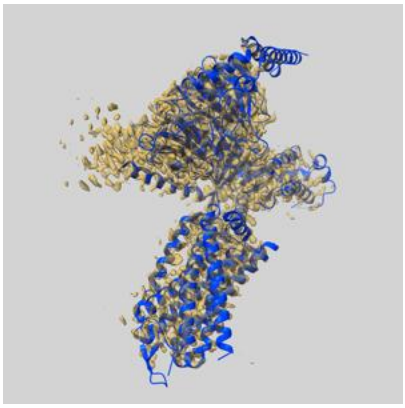
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.51	-	-
Author-provided FSC curve	2.51	2.95	2.64
Unmasked-calculated*	3.20	3.89	3.28

*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 3.20 differs from the reported value 2.51 by more than 10 %

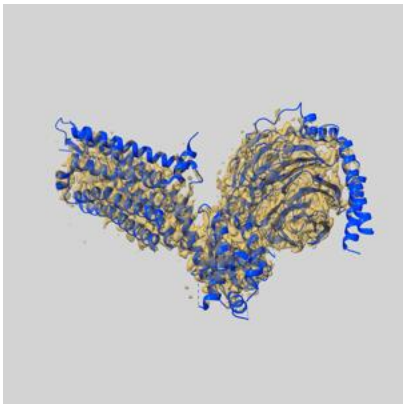
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-44643 and PDB model 9BKK. Per-residue inclusion information can be found in section 3 on page 7.

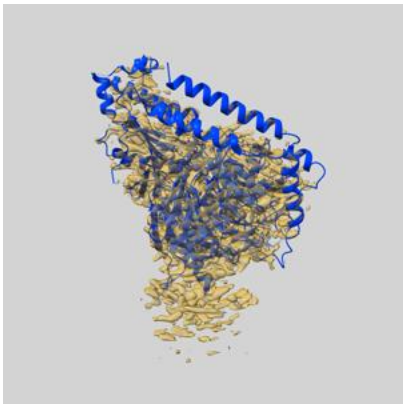
9.1 Map-model overlay



X



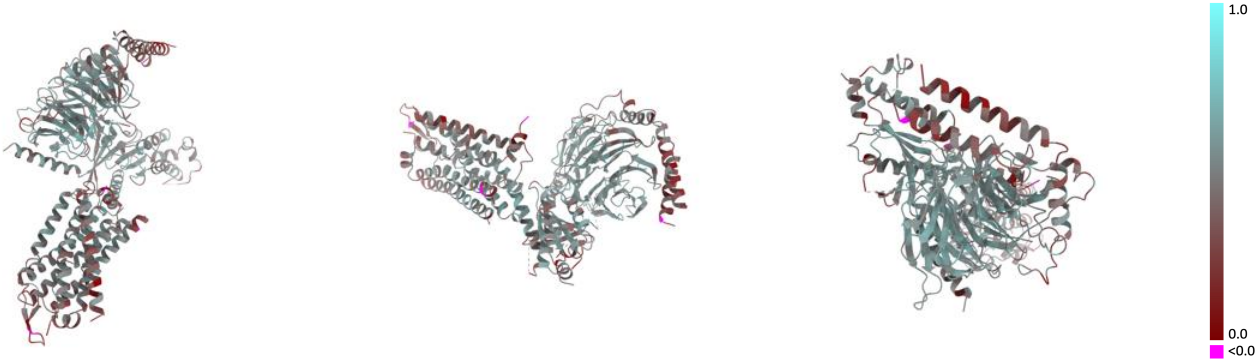
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.75 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.

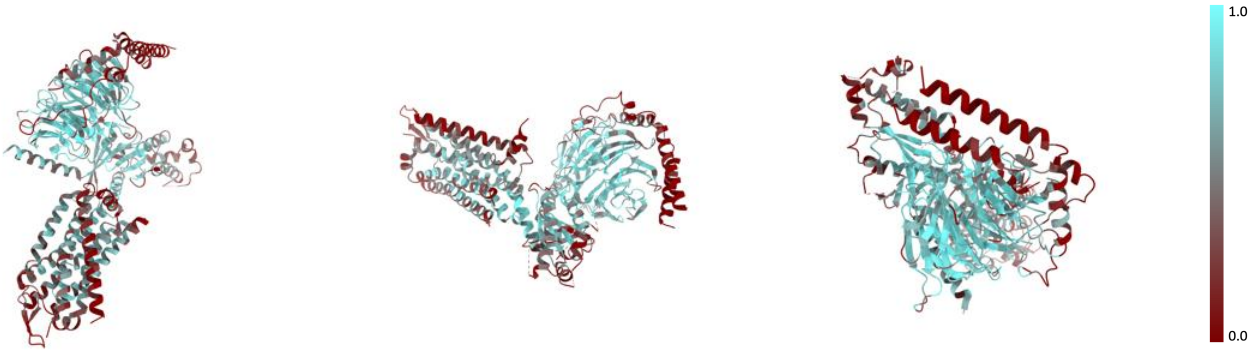
9.2 Q-score mapped to coordinate model



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.

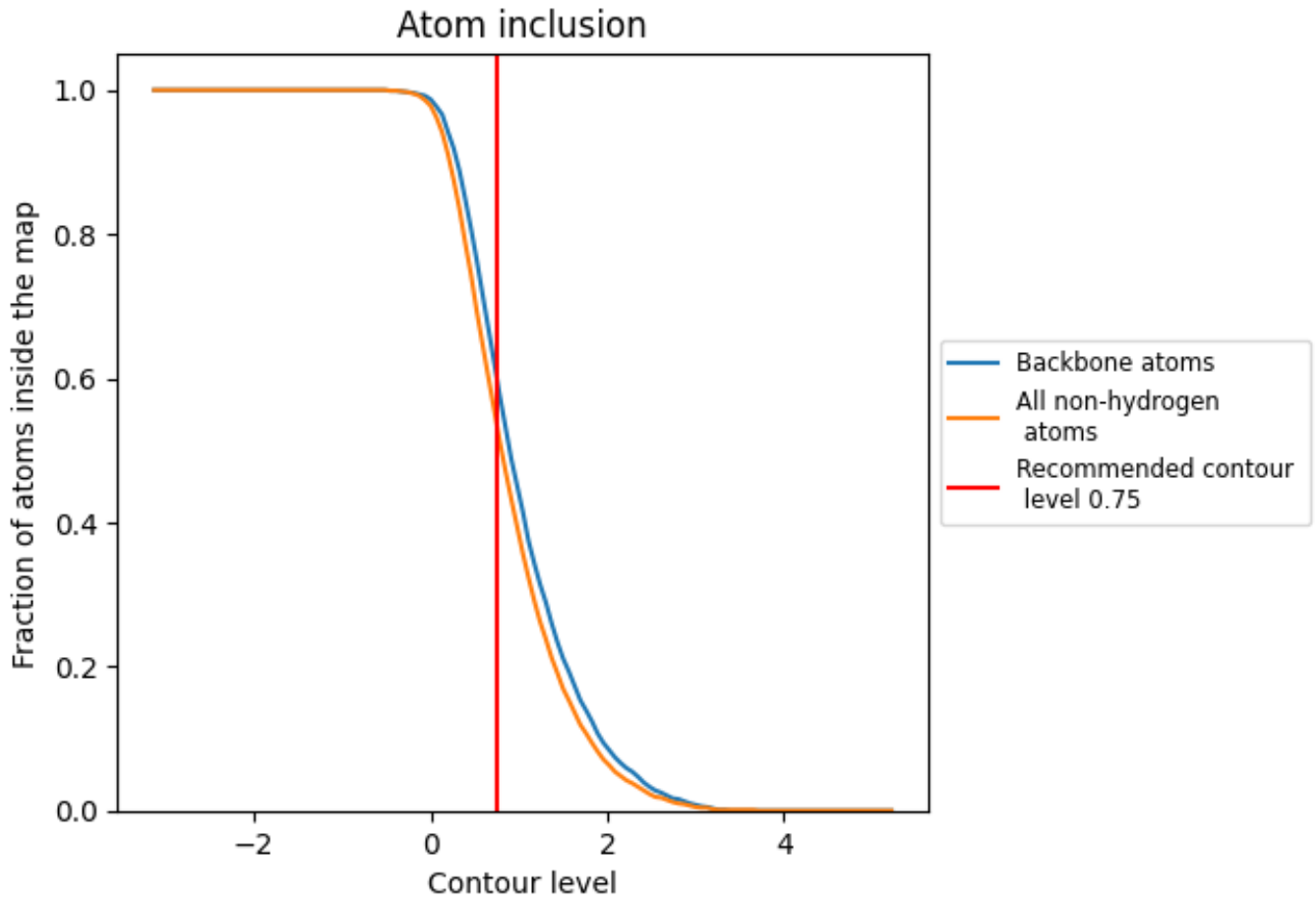
9.3 Atom inclusion mapped to coordinate model



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 (0.75).

9.4 Atom inclusion (i)



At the recommended contour level, 60% of all backbone atoms, 54% 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 (0.75) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.5350	0.4740
A	0.5590	0.4910
B	0.6640	0.5150
G	0.2390	0.3850
P	0.4610	0.4100
R	0.4290	0.4340