wwPDB EM Validation Summary Report

Mar 3, 2025 – 04:36 PM JST

PDB ID	:	9L3Y
EMDB ID	:	EMD-62798
Title	:	Cryo-EM structure of the G-protein coupled receptor 1 (GPR1) in complex with chemerin and Gi1
Authors	:	Zhu, Y.; He, M.; Wu, B.; Zhao, Q.
Deposited on	:	2024-12-19
Resolution	:	3.60 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

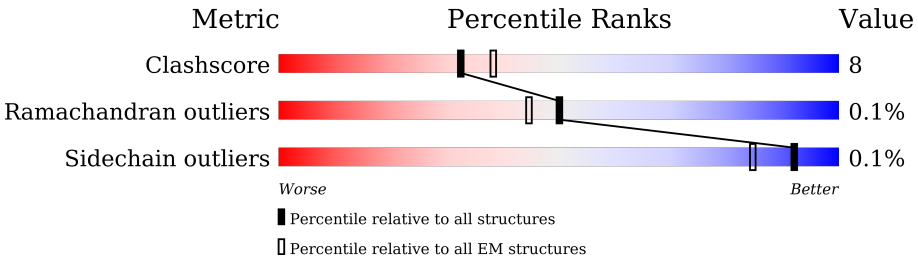
EMDB validation analysis	:	0.0.1.dev117
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	R	368	63% 18% 19%
2	L	137	56% 19% 25%
3	A	354	50% 10% 40%
4	B	340	7% 78% 19%
5	C	71	21% 68% 28%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 7383 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 Chemerin-like receptor 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	R	298	2391	1620	380	380	11	0	0

There are 46 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	323	GLU	-	expression tag	UNP P46091
R	324	PHE	-	expression tag	UNP P46091
R	325	LEU	-	expression tag	UNP P46091
R	326	GLU	-	expression tag	UNP P46091
R	327	VAL	-	expression tag	UNP P46091
R	328	LEU	-	expression tag	UNP P46091
R	329	PHE	-	expression tag	UNP P46091
R	330	GLN	-	expression tag	UNP P46091
R	331	GLY	-	expression tag	UNP P46091
R	332	PRO	-	expression tag	UNP P46091
R	333	TRP	-	expression tag	UNP P46091
R	334	SER	-	expression tag	UNP P46091
R	335	HIS	-	expression tag	UNP P46091
R	336	PRO	-	expression tag	UNP P46091
R	337	GLN	-	expression tag	UNP P46091
R	338	PHE	-	expression tag	UNP P46091
R	339	GLU	-	expression tag	UNP P46091
R	340	LYS	-	expression tag	UNP P46091
R	341	GLY	-	expression tag	UNP P46091
R	342	GLY	-	expression tag	UNP P46091
R	343	GLY	-	expression tag	UNP P46091
R	344	SER	-	expression tag	UNP P46091
R	345	GLY	-	expression tag	UNP P46091
R	346	GLY	-	expression tag	UNP P46091
R	347	GLY	-	expression tag	UNP P46091
R	348	SER	-	expression tag	UNP P46091
R	349	GLY	-	expression tag	UNP P46091
R	350	GLY	-	expression tag	UNP P46091

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
R	351	SER	-	expression tag	UNP P46091
R	352	ALA	-	expression tag	UNP P46091
R	353	TRP	-	expression tag	UNP P46091
R	354	SER	-	expression tag	UNP P46091
R	355	HIS	-	expression tag	UNP P46091
R	356	PRO	-	expression tag	UNP P46091
R	357	GLN	-	expression tag	UNP P46091
R	358	PHE	-	expression tag	UNP P46091
R	359	GLU	-	expression tag	UNP P46091
R	360	LYS	-	expression tag	UNP P46091
R	361	ASP	-	expression tag	UNP P46091
R	362	TYR	-	expression tag	UNP P46091
R	363	LYS	-	expression tag	UNP P46091
R	364	ASP	-	expression tag	UNP P46091
R	365	ASP	-	expression tag	UNP P46091
R	366	ASP	-	expression tag	UNP P46091
R	367	ASP	-	expression tag	UNP P46091
R	368	LYS	-	expression tag	UNP P46091

- Molecule 2 is a protein called Retinoic acid receptor responder protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	L	103	Total	C	N	O	S	0	0
			669	421	118	124	6		

- Molecule 3 is a protein called Guanine nucleotide-binding protein G(i) subunit alpha-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	211	Total	C	N	O	S	0	0
			1587	1019	267	290	11		

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	47	CYS	SER	engineered mutation	UNP P63096
A	202	THR	GLY	engineered mutation	UNP P63096
A	203	ALA	GLY	engineered mutation	UNP P63096
A	245	ALA	GLU	engineered mutation	UNP P63096
A	326	SER	ALA	engineered mutation	UNP P63096

- Molecule 4 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	B	330	Total	C	N	O	S	0	0
			2408	1502	420	466	20		

- Molecule 5 is a protein called Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2.

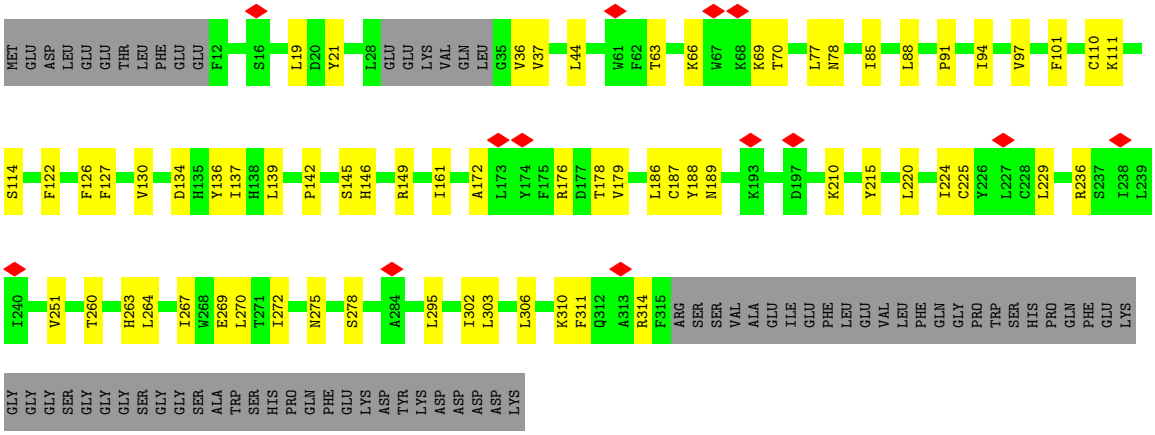
Mol	Chain	Residues	Atoms					AltConf	Trace
5	C	51	Total	C	N	O	S	0	0
			328	207	58	61	2		

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.

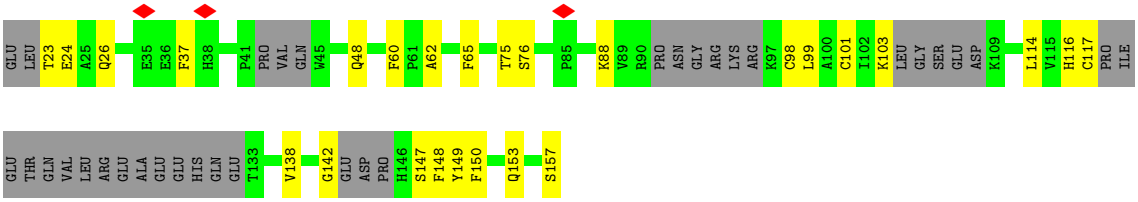
• Molecule 1: Chemerin-like receptor 2

Chain R:



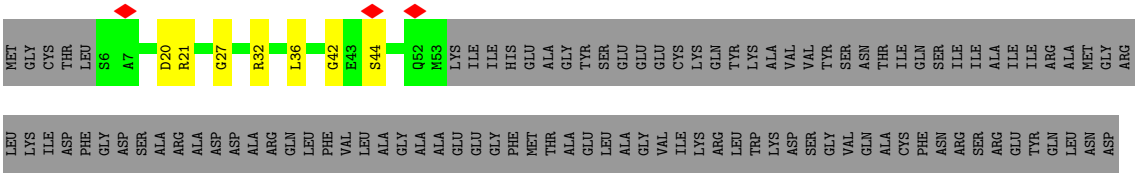
• Molecule 2: Retinoic acid receptor responder protein 2

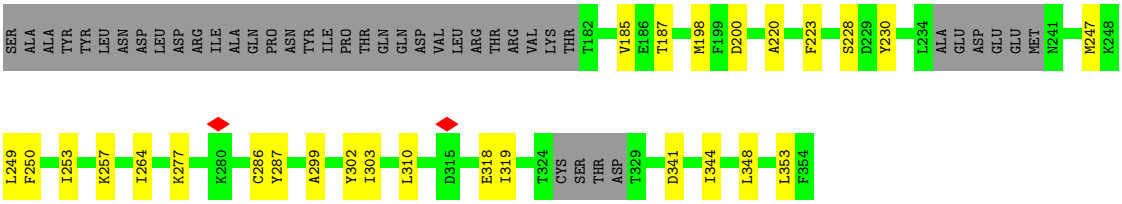
Chain L:



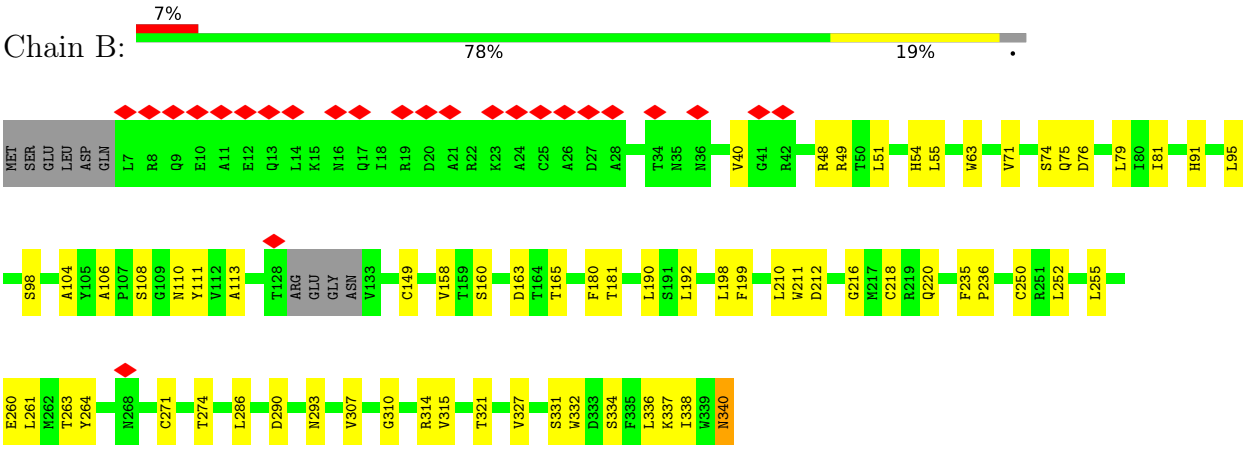
• Molecule 3: Guanine nucleotide-binding protein G(i) subunit alpha-1

Chain A:

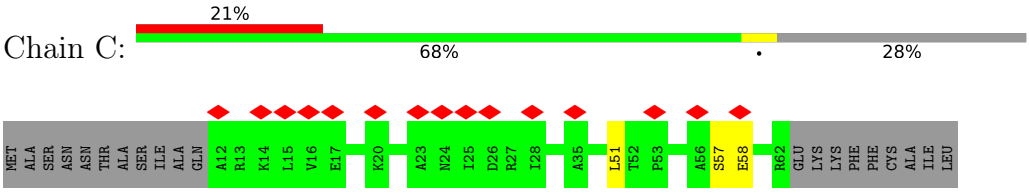




• Molecule 4: Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-1



• Molecule 5: Guanine nucleotide-binding protein G(I)/G(S)/G(O) subunit gamma-2



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	59593	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	70	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	4.116	Depositor
Minimum map value	-1.261	Depositor
Average map value	0.012	Depositor
Map value standard deviation	0.066	Depositor
Recommended contour level	0.4	Depositor
Map size (Å)	274.176, 274.176, 274.176	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.071, 1.071, 1.071	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	R	0.25	0/2471	0.47	0/3380
2	L	0.25	0/677	0.50	0/921
3	A	0.25	0/1615	0.45	0/2187
4	B	0.24	0/2454	0.48	0/3343
5	C	0.25	0/334	0.38	0/462
All	All	0.25	0/7551	0.47	0/10293

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	R	2391	0	2376	48	0
2	L	669	0	532	20	0
3	A	1587	0	1487	22	0
4	B	2408	0	2237	38	0
5	C	328	0	274	2	0
All	All	7383	0	6906	119	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 8.

The worst 5 of 119 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)
2:L:75:THR:HG22	2:L:76:SER:H	1.54	0.71
4:B:71:VAL:HG12	4:B:81:ILE:HG12	1.71	0.71
3:A:185:VAL:HB	3:A:200:ASP:HB3	1.73	0.70
1:R:142:PRO:HB3	3:A:344:ILE:HD11	1.73	0.70
4:B:48:ARG:HG3	4:B:340:ASN:HB3	1.75	0.69

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	R	294/368 (80%)	262 (89%)	32 (11%)	0	100 100
2	L	91/137 (66%)	81 (89%)	9 (10%)	1 (1%)	12 45
3	A	203/354 (57%)	185 (91%)	18 (9%)	0	100 100
4	B	326/340 (96%)	315 (97%)	11 (3%)	0	100 100
5	C	49/71 (69%)	49 (100%)	0	0	100 100
All	All	963/1270 (76%)	892 (93%)	70 (7%)	1 (0%)	50 79

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	L	60	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	R	255/333 (77%)	255 (100%)	0	100	100
2	L	52/121 (43%)	52 (100%)	0	100	100
3	A	157/306 (51%)	157 (100%)	0	100	100
4	B	243/283 (86%)	242 (100%)	1 (0%)	89	95
5	C	24/58 (41%)	24 (100%)	0	100	100
All	All	731/1101 (66%)	730 (100%)	1 (0%)	92	97

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	B	340	ASN

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

Mol	Chain	Res	Type
2	L	153	GLN
3	A	347	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)

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

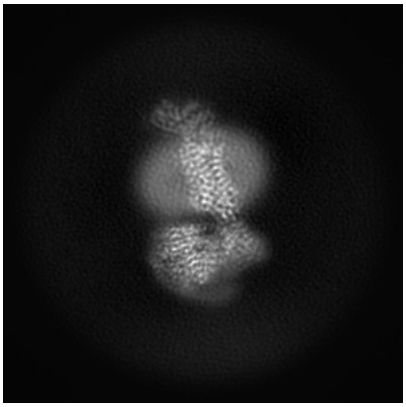
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-62798. These allow visual inspection of the internal detail of the map and identification of artifacts.

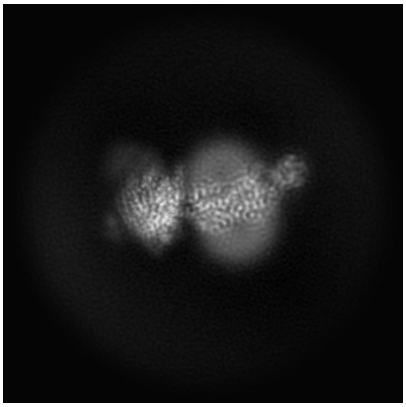
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

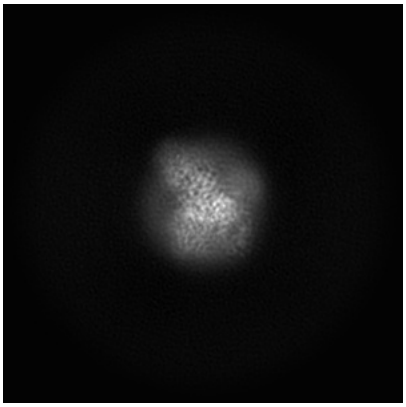
6.1.1 Primary map



X



Y

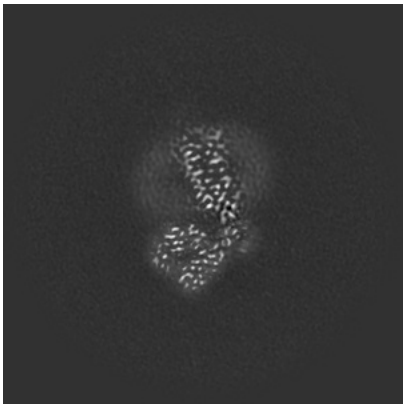


Z

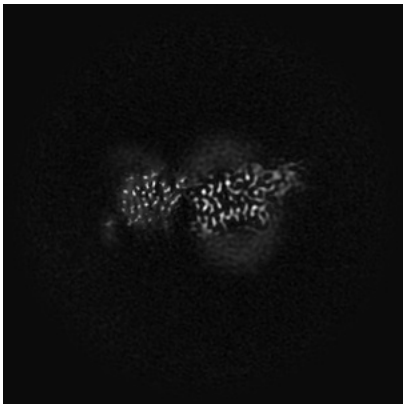
The images above show the map projected in three orthogonal directions.

6.2 Central slices

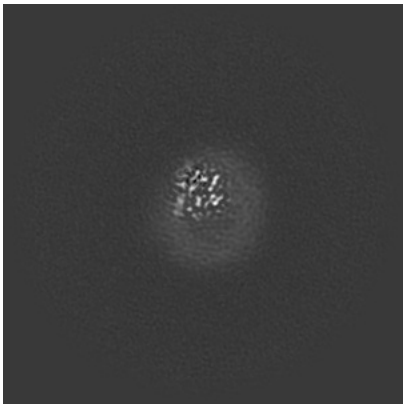
6.2.1 Primary map



X Index: 128



Y Index: 128

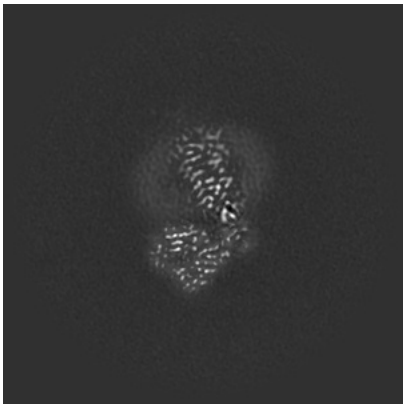


Z Index: 128

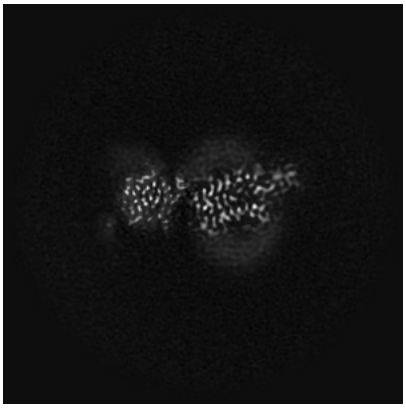
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

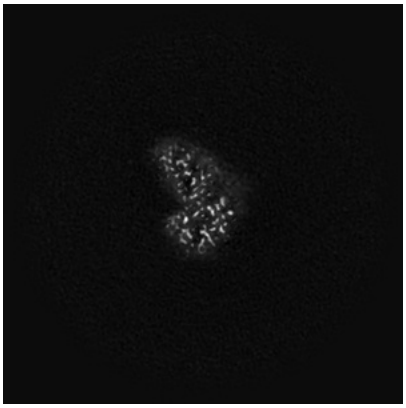
6.3.1 Primary map



X Index: 129



Y Index: 129

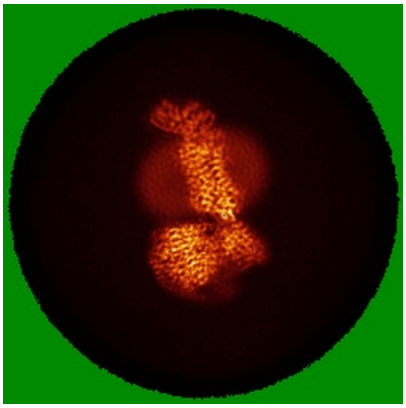


Z Index: 102

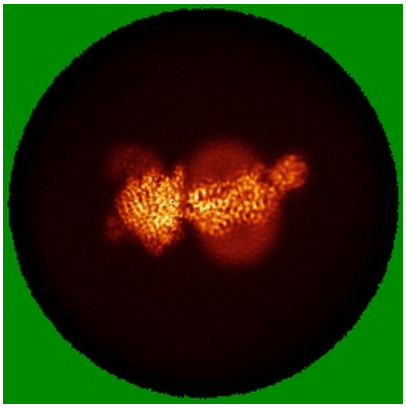
The images above show the largest variance slices of the map in three orthogonal directions.

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

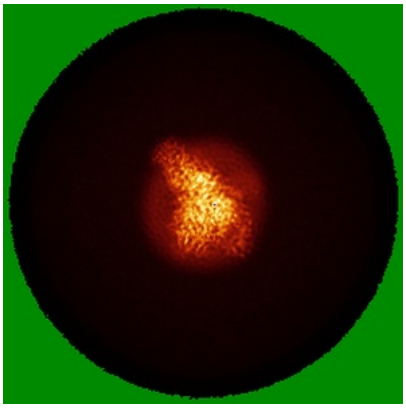
6.4.1 Primary map



X



Y



Z

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 0.4. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

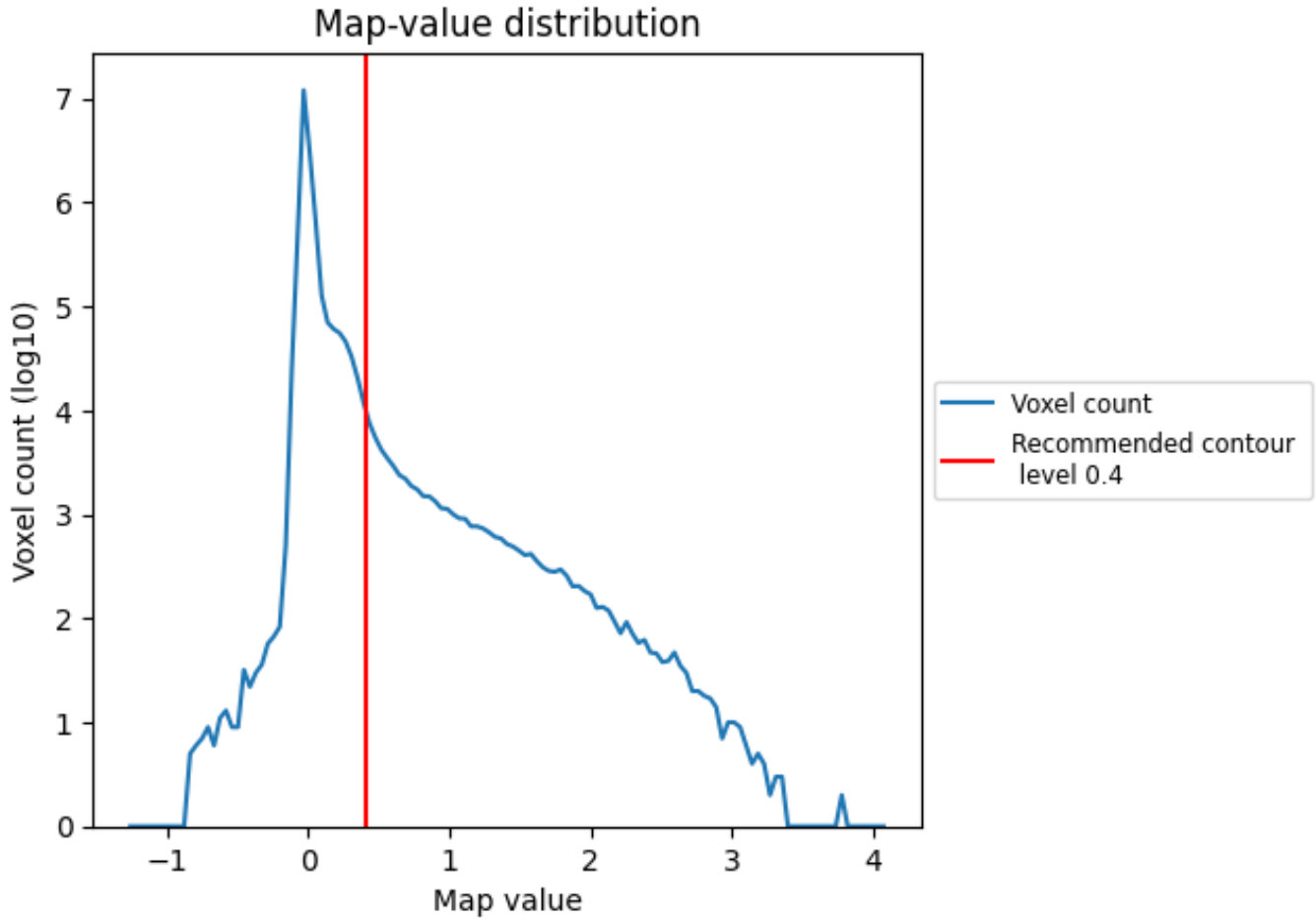
6.6 Mask visualisation (i)

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

7 Map analysis

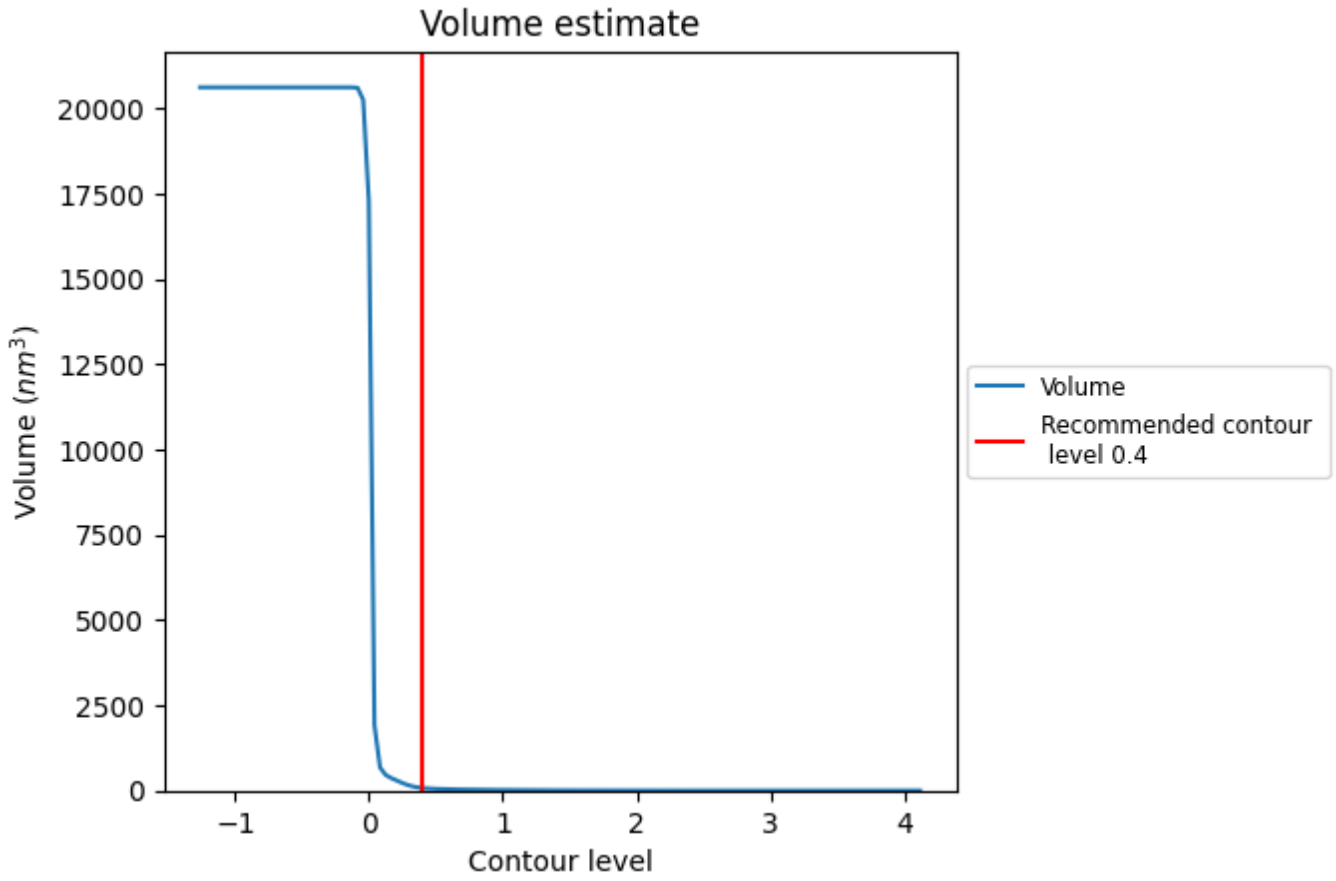
This section contains the results of statistical analysis of the map.

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.

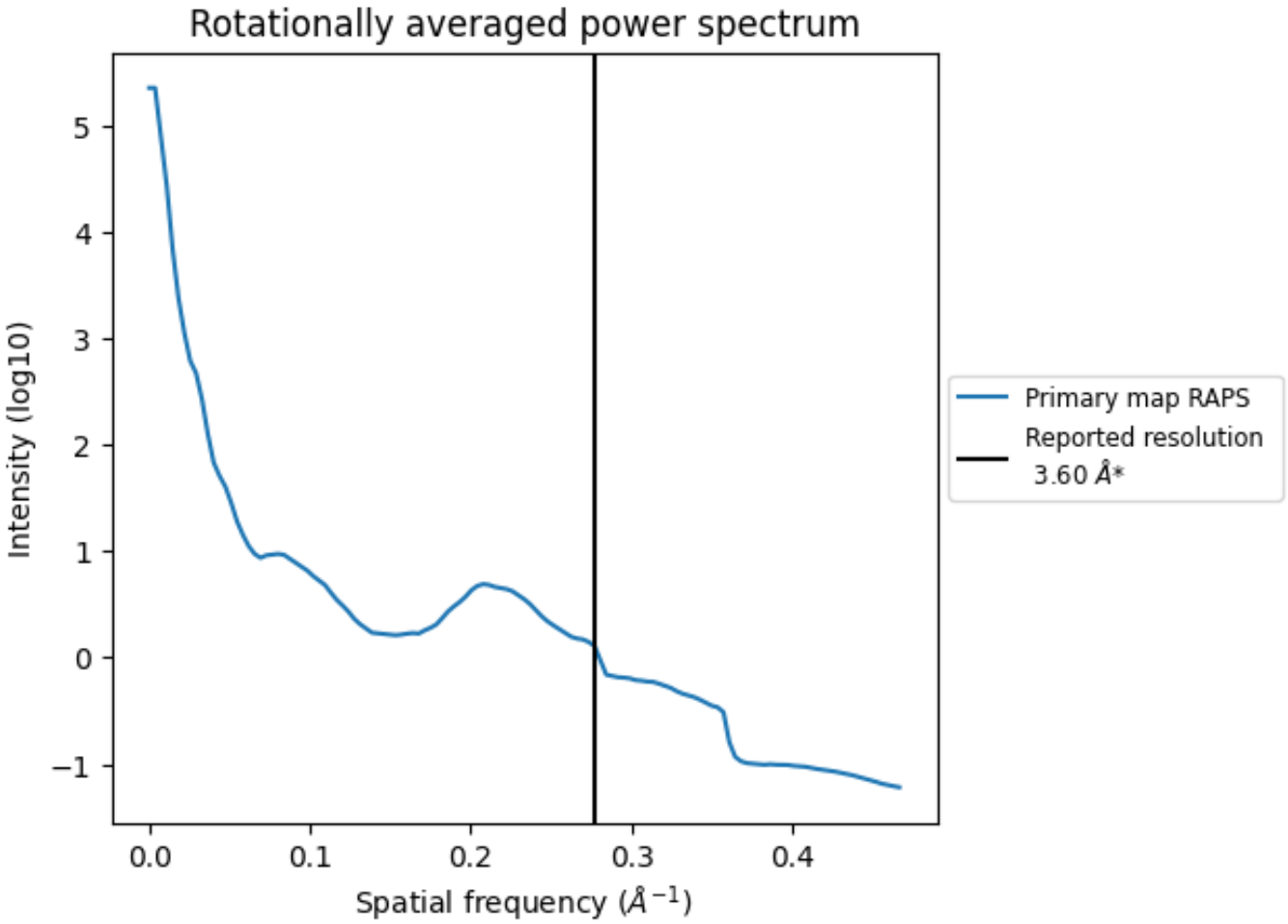
7.2 Volume estimate (i)



The volume at the recommended contour level is 75 nm^3; this corresponds to an approximate mass of 68 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 0.278 $Å^{-1}$

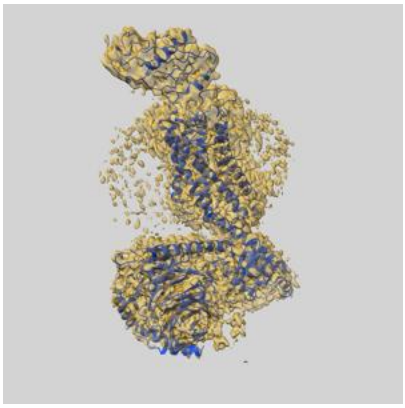
8 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

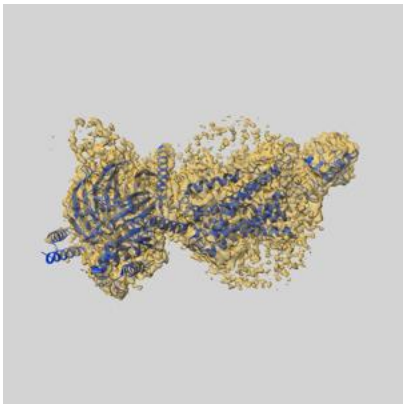
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-62798 and PDB model 9L3Y. Per-residue inclusion information can be found in section 3 on page 6.

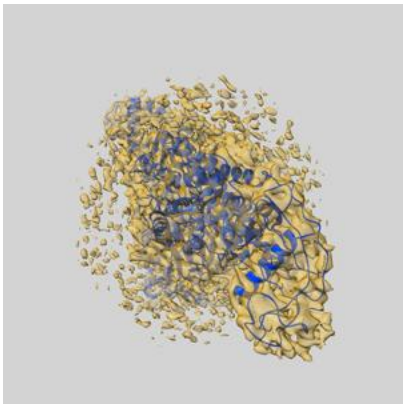
9.1 Map-model overlay



X



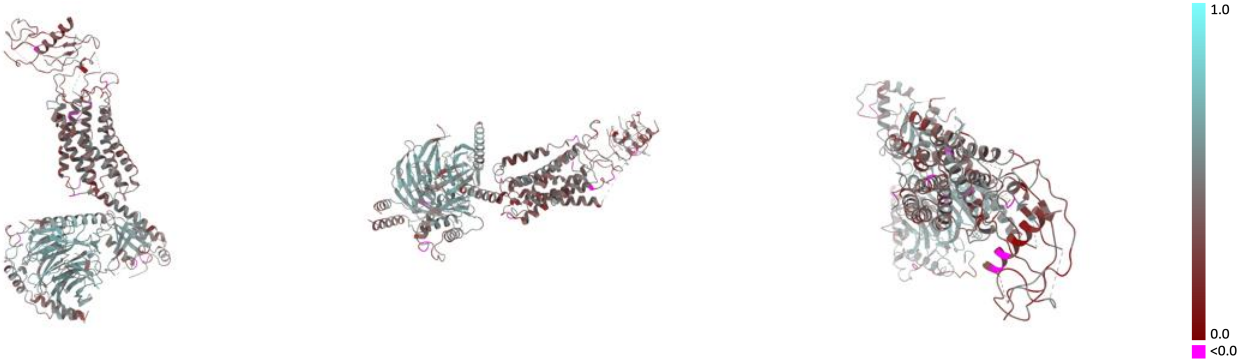
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.4 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.

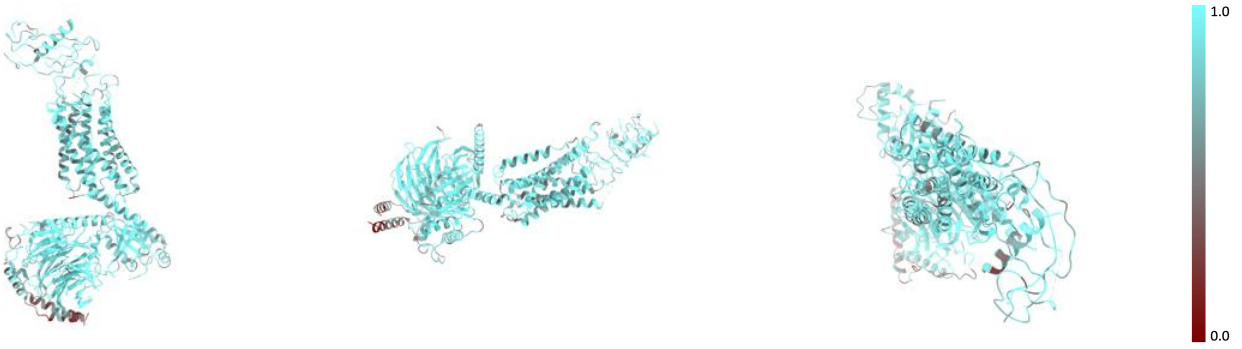
9.2 Q-score mapped to coordinate model (i)



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.

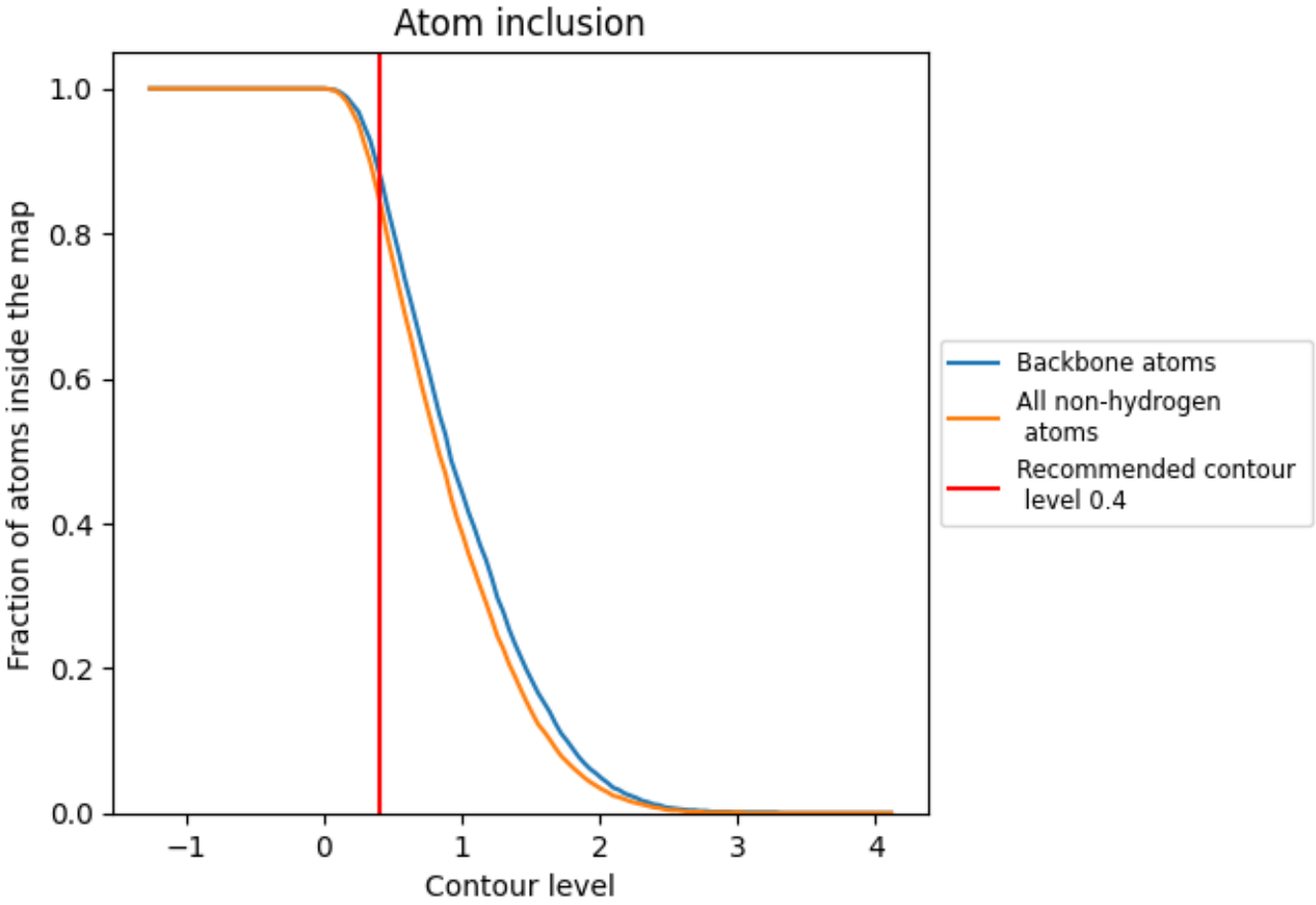
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.4).

9.4 Atom inclusion (i)



At the recommended contour level, 89% of all backbone atoms, 85% 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 (0.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8480	0.4490
A	0.8600	0.4670
B	0.8930	0.5430
C	0.6250	0.4300
L	0.8060	0.3350
R	0.8390	0.3780