



wwPDB EM Validation Summary Report ⓘ

Oct 14, 2024 – 03:23 PM EDT

PDB ID : 9C47
EMDB ID : EMD-45176
Title : TRRAP module of the human TIP60 complex
Authors : Yang, Z.; Mameri, A.; Florez Ariza, A.J.; Cote, J.; Nogales, E.
Deposited on : 2024-06-03
Resolution : 3.40 Å (reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

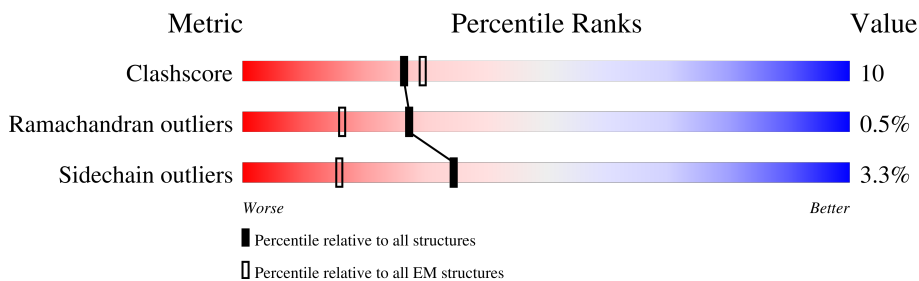
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.40 Å.

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



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

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

Mol	Chain	Length	Quality of chain
1	C	3859	
2	G	3159	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 52167 atoms, of which 26380 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 Transformation/transcription domain-associated protein.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	C	3079	50044	15891	25317	4263	4390	183	0	0

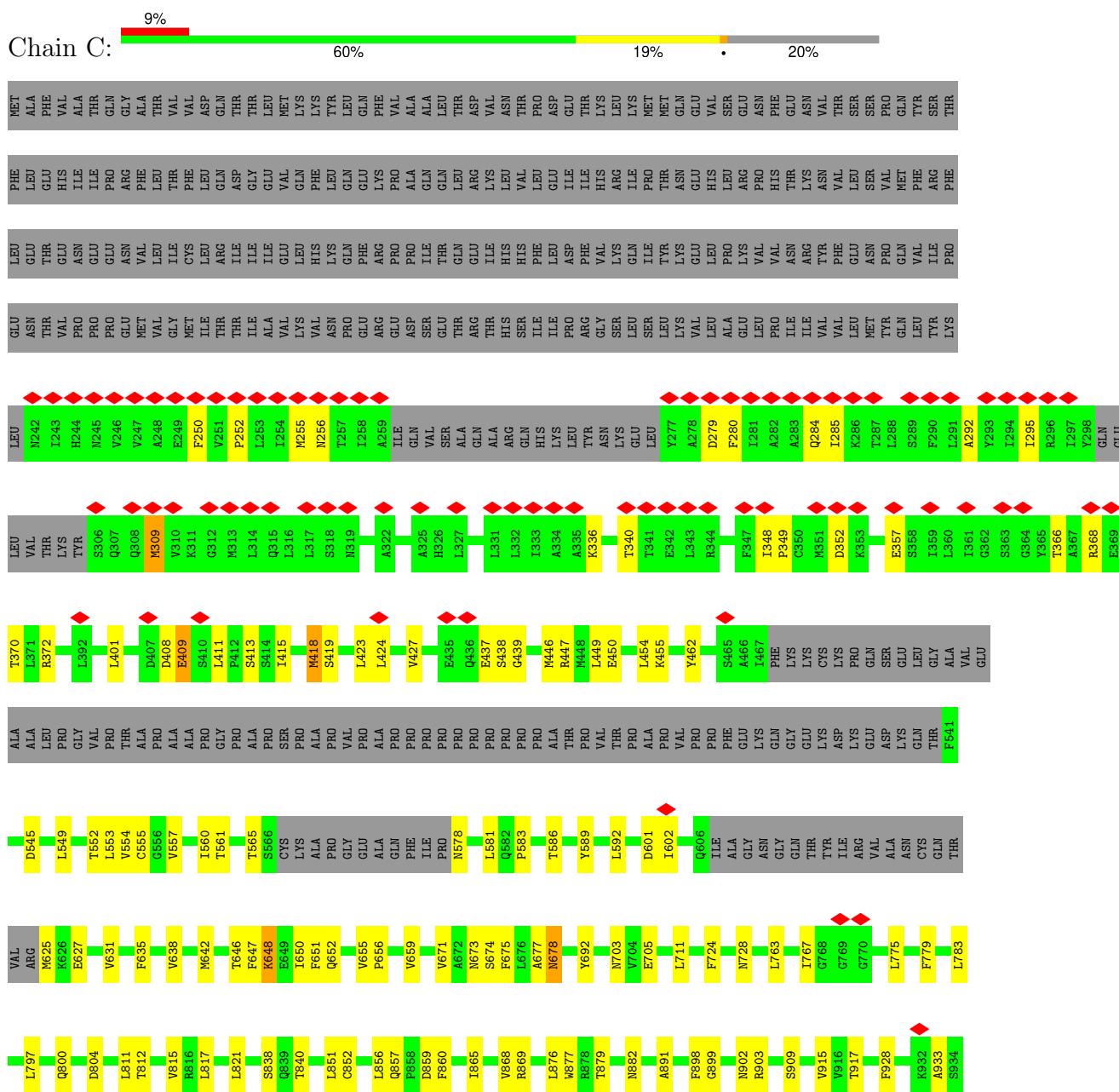
- Molecule 2 is a protein called E1A-binding protein p400.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	G	133	2123	669	1063	186	201	4	0	0

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: Transformation/transcription domain-associated protein



ASP	K3415	F3420	D3423	F3424	S3427	V3428	P3429	G3430	S3431	M3432	K3446	G3464	S3469	N3470	E3479	I3480	P3481	L3485	K3488	P3489	T3490	H3491	Y3492	T3493	K3495	K3508	H3509	N3510	L3516	Y3526	P3527	Y3528	L3529	V3530	D3533	A3534	C3535	L3536	T3537	E3538									
Q3307	L3315	L3318	E3319	V3322	D3323	E3330	N3331	H3332	H3333	A3357	V3358	S3359	D3360	A3361	N3369	F3370	K3373	L3374	F3378	G3379	VAL	GLY	LEU	GLU	ASN	VAL	SER	ASN	VAL	F3267	R3270	T3276	R3283	TYR	LYS	SER	ASP	PRO	LEU	ALA	ARG	ARG	ALA	ALA	ALA	GLN	THR	ALA	GLN
I3180	Y3183	C3187	Q3190	N3191	E3192	S3193	K3194	L3199	L3205	D3210	D3211	K3212	A3218	V3219	G2959	R2960	N2961	N2962	S2963	M2967	V2970	R2977	D2983	V2988	S2989	H2998	W3005	M3008	HIS	SER	SER	ILE	VAL	THR	ALA	TYR	GLU	ASN	SER	GLN	HIS	ASP	P3025						
Y2895	T2899	H2700	N2701	L2702	T2707	L2708	E2711	F2715	E2716	K2717	GLY	LEU	SER	LEU	GLN	LYS	PRO	LYS	GLN	THR	THR	GLU	PHE	TYR	GLU	GLN	GLU	ILE	THR	PRO	F2740	Q2741	E2743	D2746	L2751	D2759	R2768	S2772	E2773	T2774	E2781	Q2788	S2792						
A2796	M2797	K2798	A2800	H2804	E2805	R2806	A2809	S2810	Q2818	L2819	W2820	E2821	H2823	N2832	Q2833	W2834	Y2840	H2846	L2847	H2848	P2849	Y2850	L2851	C2855	R2858	M2865	V2872	E2873	V2874	C2876	M2880	K2883	V2884	R2888	L2891	V2908	A2911	S2912	S2913										
V2926	P2932	Q2935	A2936	I2940	I2941	E2942	Q2944	E2945	A2946	I2949	T2956	N2957	L2958	G2959	R2960	N2961	N2962	S2963	M2967	V2970	R2977	D2983	V2988	S2989	H2998	W3005	M3008	HIS	SER	SER	ILE	VAL	THR	ALA	TYR	GLU	ASN	SER	GLN	HIS	ASP	P3025							
Y3044	I3047	V3054	L3058	S3062	L3089	ALA	GLY	VAL	MET	GLY	LYS	N3096	L3102	I3105	L3110	K3111	K3115	T3118	Y3122	Q3237	L3251	V3257	Y3266	F3267	R3270	T3276	R3283	TYR	LYS	SER	ASP	PRO	LEU	GLY	PRO	ILE	ARG	ALA	ALA	ALA	GLN	THR	ALA	GLN					
I3180	Y3183	C3187	Q3190	N3191	E3192	S3193	K3194	L3199	L3205	D3210	D3211	K3212	A3218	V3219	G2959	R2960	N2961	N2962	S2963	M2967	V2970	R2977	D2983	V2988	S2989	H2998	W3005	M3008	HIS	SER	SER	ILE	VAL	THR	ALA	TYR	GLU	ASN	SER	GLN	HIS	ASP	P3025						
Q3307	L3315	L3318	E3319	V3322	D3323	E3330	N3331	H3332	H3333	A3357	V3358	S3359	D3360	A3361	N3369	F3370	K3373	L3374	F3378	G3379	VAL	GLY	LEU	GLU	ASN	VAL	SER	ASN	VAL	F3267	R3270	T3276	R3283	TYR	LYS	SER	ASP	PRO	LEU	ALA	ARG	ARG	ALA	ALA	ALA	GLN	THR	ALA	GLN

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	23442	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	2.397	Depositor
Minimum map value	-1.369	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.073	Depositor
Recommended contour level	0.451	Depositor
Map size (\AA)	377.99997, 377.99997, 377.99997	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.05, 1.05, 1.05	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	C	0.24	0/25236	0.46	1/34128 (0.0%)
2	G	0.65	2/1081 (0.2%)	0.57	0/1468
All	All	0.27	2/26317 (0.0%)	0.46	1/35596 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	G	0	1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	2387	PRO	N-CD	16.70	1.71	1.47
2	G	2386	LEU	C-N	8.85	1.51	1.34

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	1291	PRO	N-CA-C	-5.41	98.02	112.10

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	G	2444	ARG	Sidechain

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	C	24727	25317	25273	480	0
2	G	1060	1063	1062	39	0
All	All	25787	26380	26335	511	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.

The worst 5 of 511 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:G:2387:PRO:N	2:G:2387:PRO:CD	1.71	1.45
2:G:2433:GLU:O	2:G:2444:ARG:NH1	1.83	1.10
1:C:3578:SER:OG	1:C:3581:MET:N	2.08	0.86
2:G:2378:GLN:NE2	2:G:2382:GLN:OE1	2.09	0.86
1:C:1574:MET:HE3	1:C:1579:LEU:HD11	1.62	0.81

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	C	3015/3859 (78%)	2824 (94%)	179 (6%)	12 (0%)	30 60
2	G	127/3159 (4%)	114 (90%)	9 (7%)	4 (3%)	3 18
All	All	3142/7018 (45%)	2938 (94%)	188 (6%)	16 (0%)	27 54

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	1062	LEU
1	C	2190	PHE
1	C	2449	CYS
1	C	3509	HIS
2	G	2393	VAL

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	C	2742/3423 (80%)	2658 (97%)	84 (3%)	35 60
2	G	119/2663 (4%)	109 (92%)	10 (8%)	9 29
All	All	2861/6086 (47%)	2767 (97%)	94 (3%)	35 58

5 of 94 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	2772	SER
1	C	3470	ASN
1	C	2799	LYS
1	C	3205	LEU
1	C	3640	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 32 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	3474	GLN
2	G	2378	GLN
1	C	1328	ASN
1	C	1312	ASN
2	G	2382	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

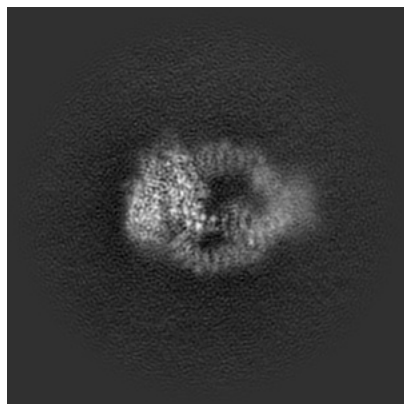
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-45176. These allow visual inspection of the internal detail of the map and identification of artifacts.

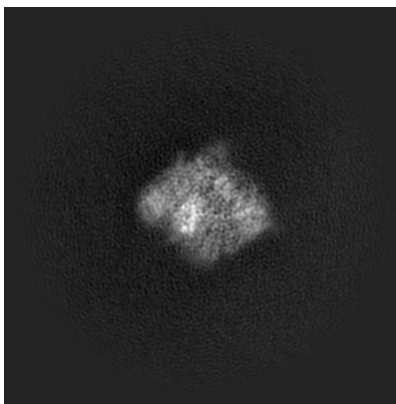
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

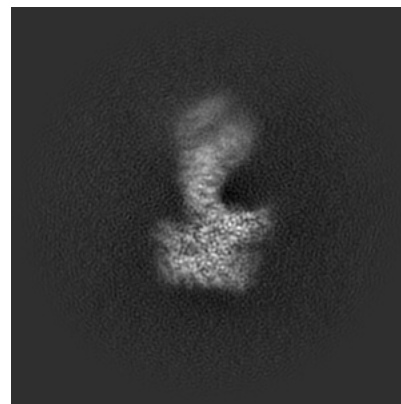
6.1.1 Primary map



X

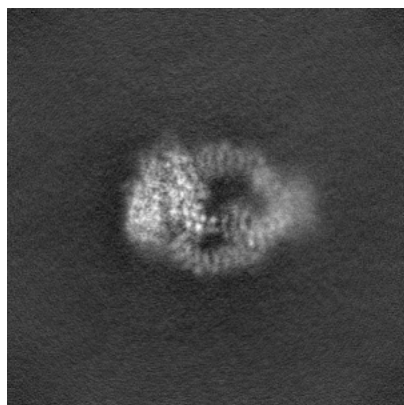


Y

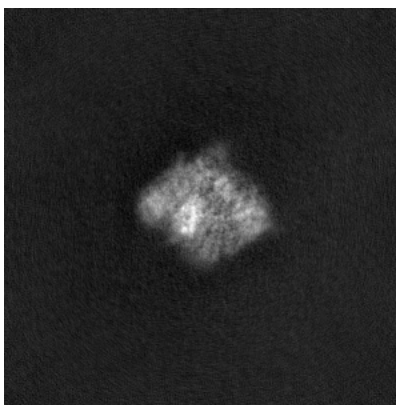


Z

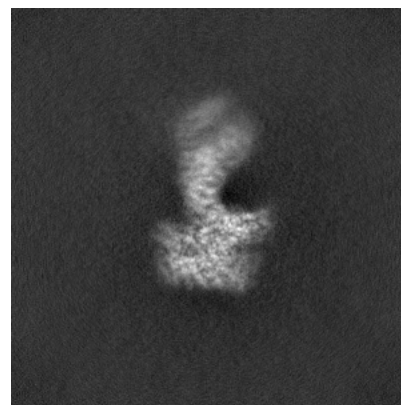
6.1.2 Raw map



X



Y

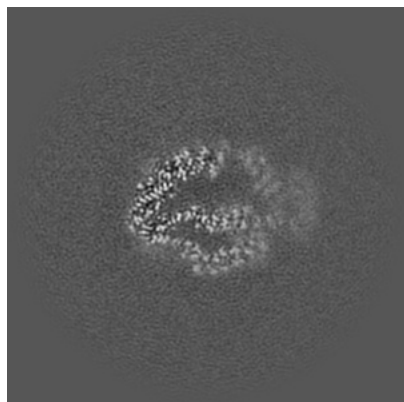


Z

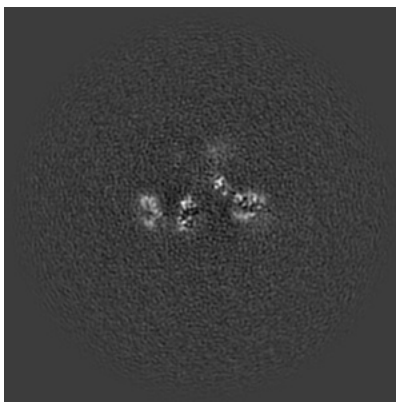
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

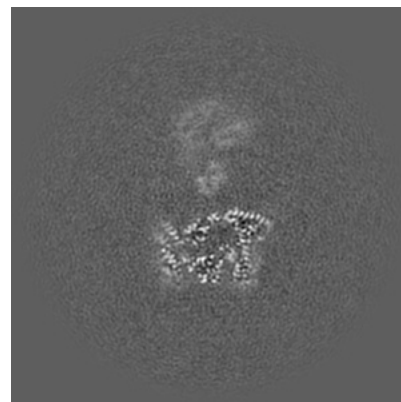
6.2.1 Primary map



X Index: 180

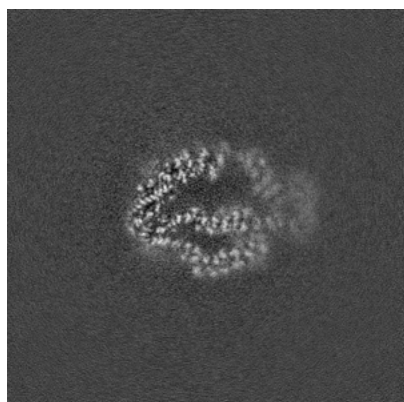


Y Index: 180



Z Index: 180

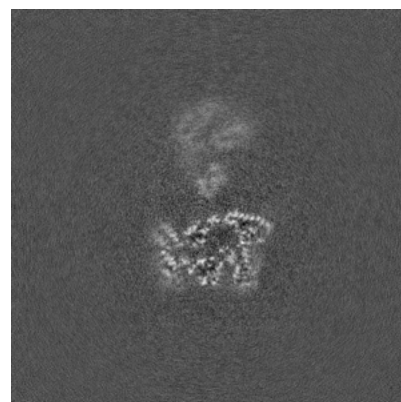
6.2.2 Raw map



X Index: 180



Y Index: 180

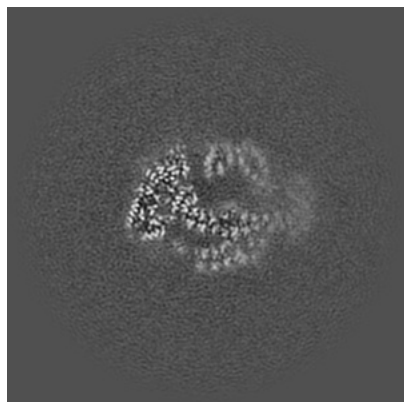


Z Index: 180

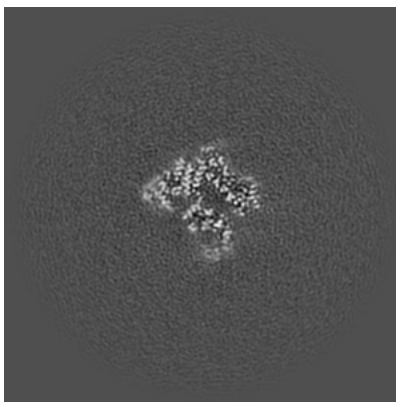
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

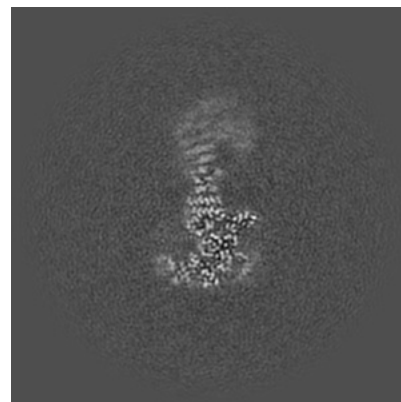
6.3.1 Primary map



X Index: 173

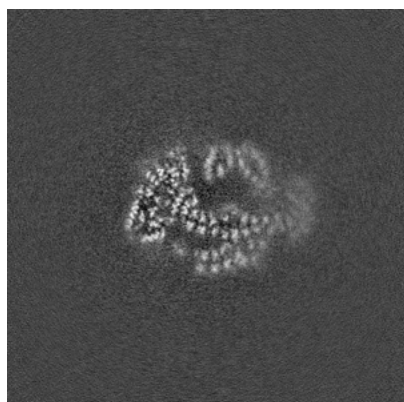


Y Index: 162

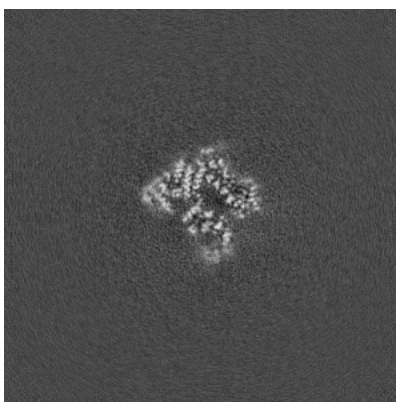


Z Index: 170

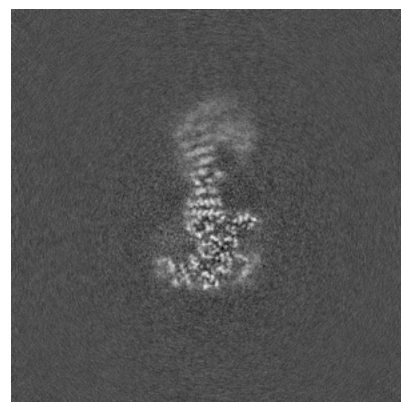
6.3.2 Raw map



X Index: 173



Y Index: 162

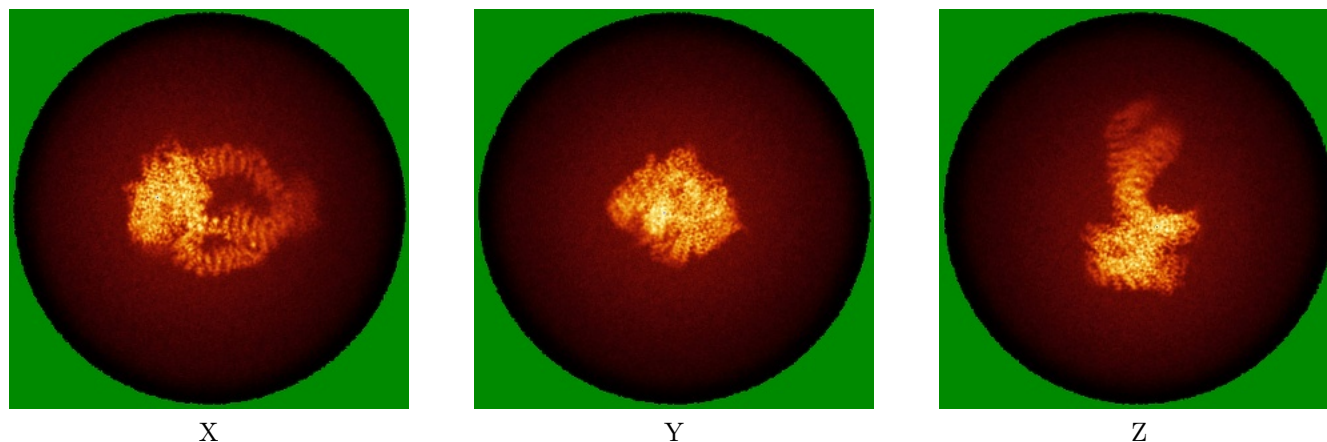


Z Index: 170

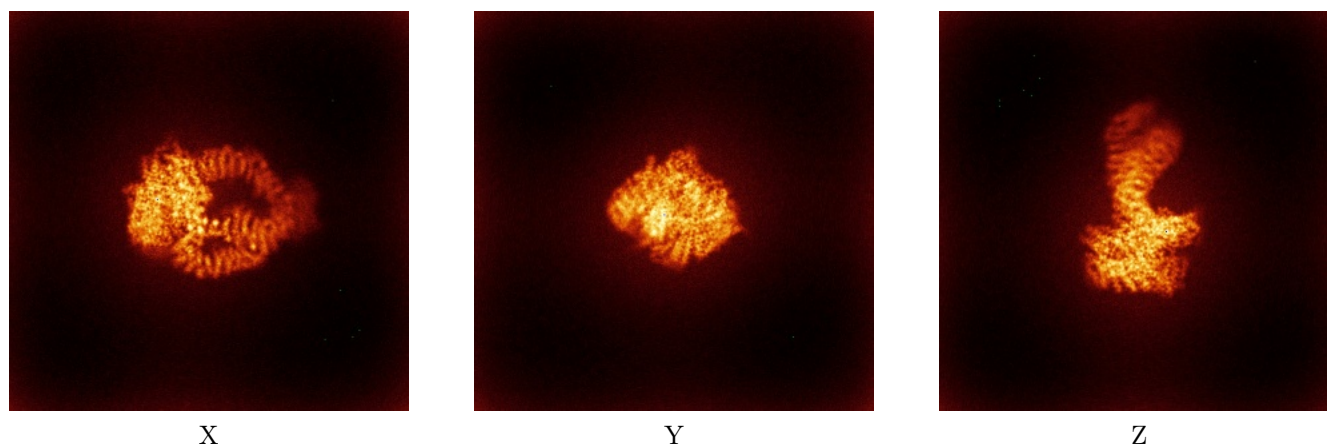
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



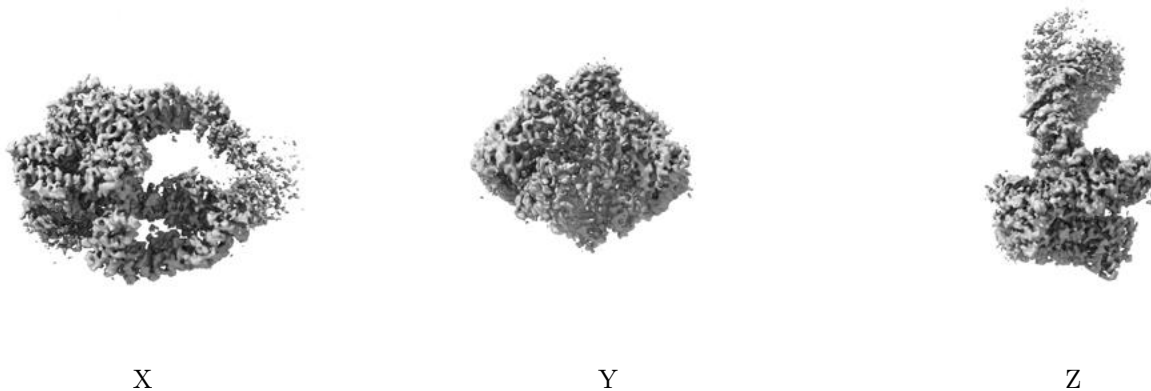
6.4.2 Raw map



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

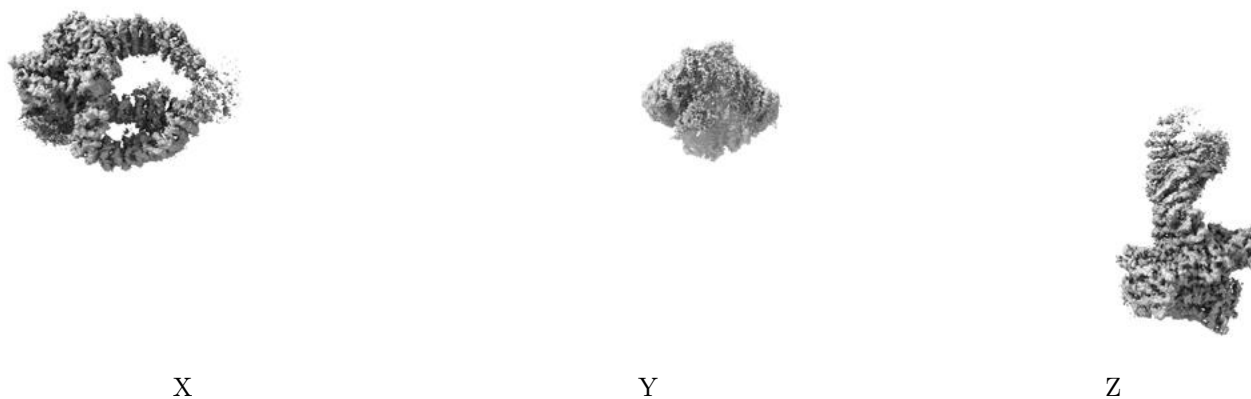
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.451. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



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

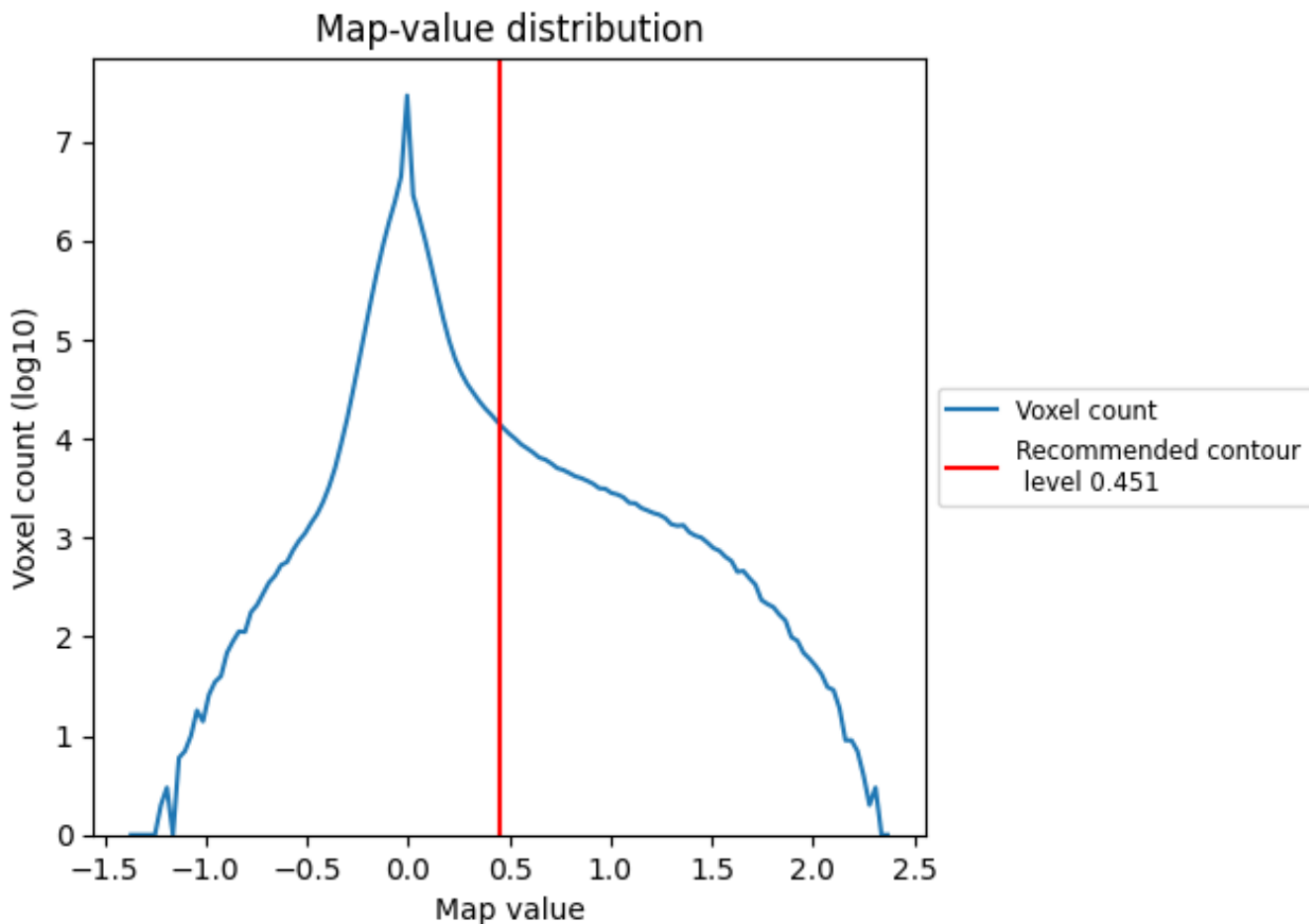
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

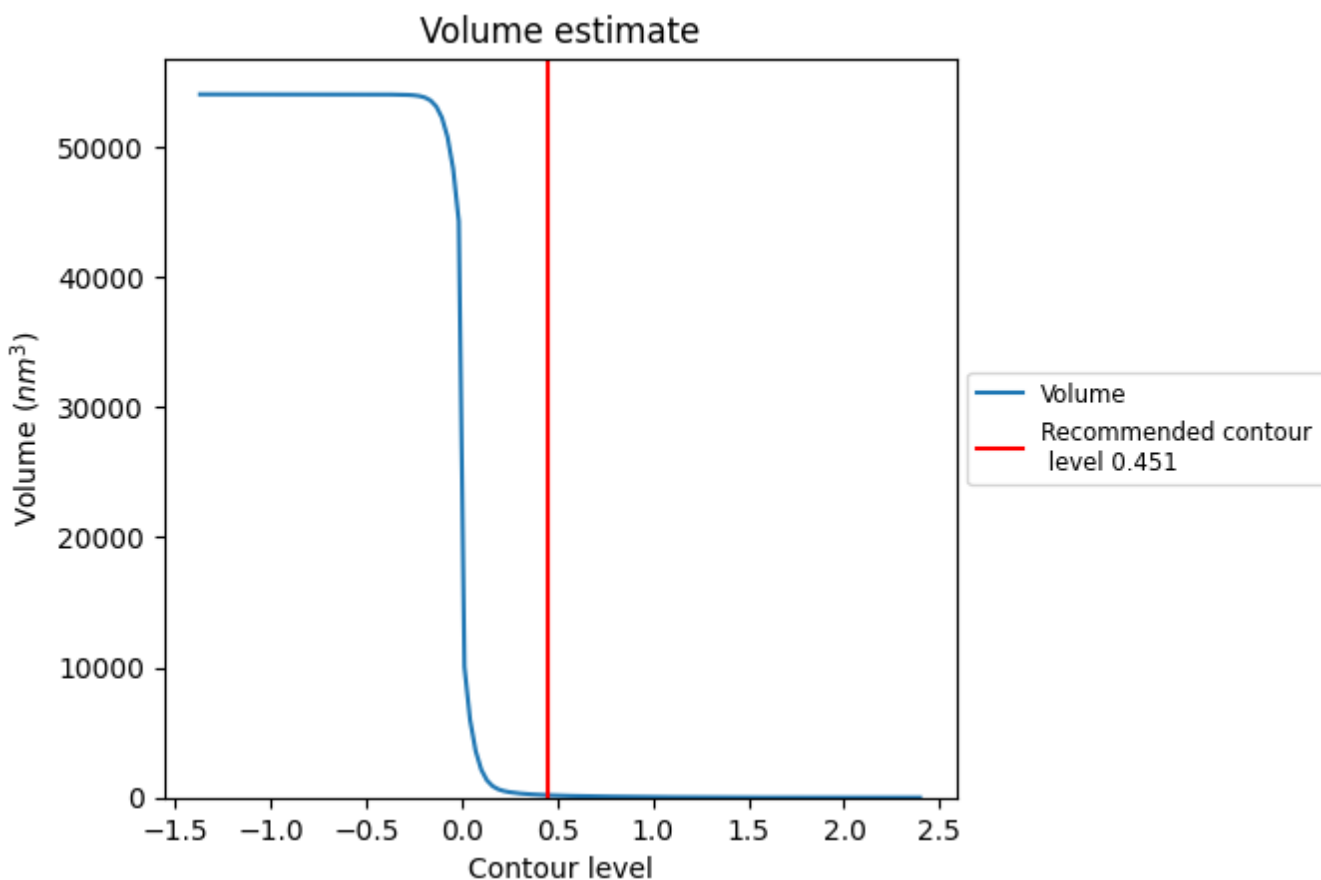
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

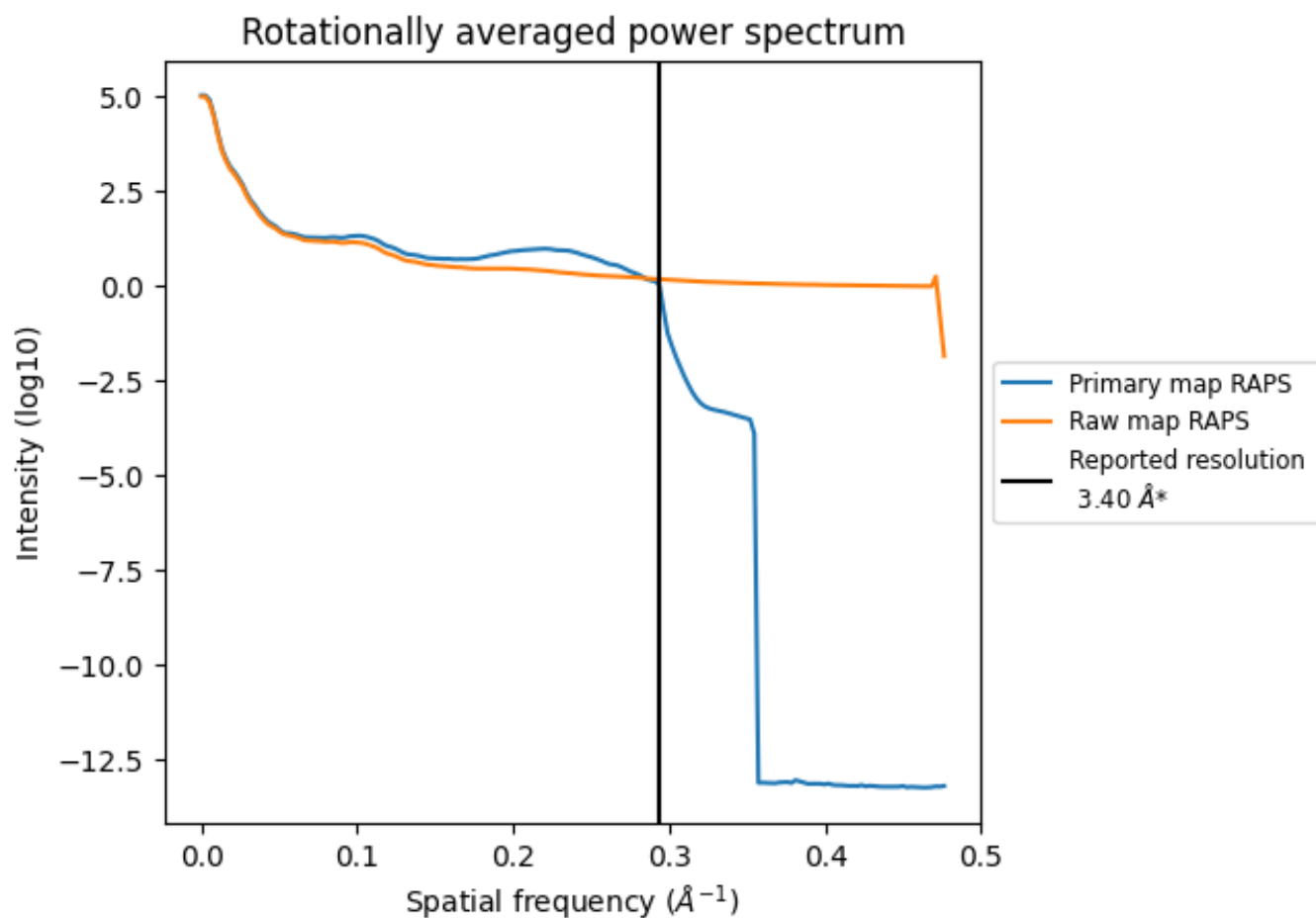
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 182 nm³; this corresponds to an approximate mass of 164 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](#)

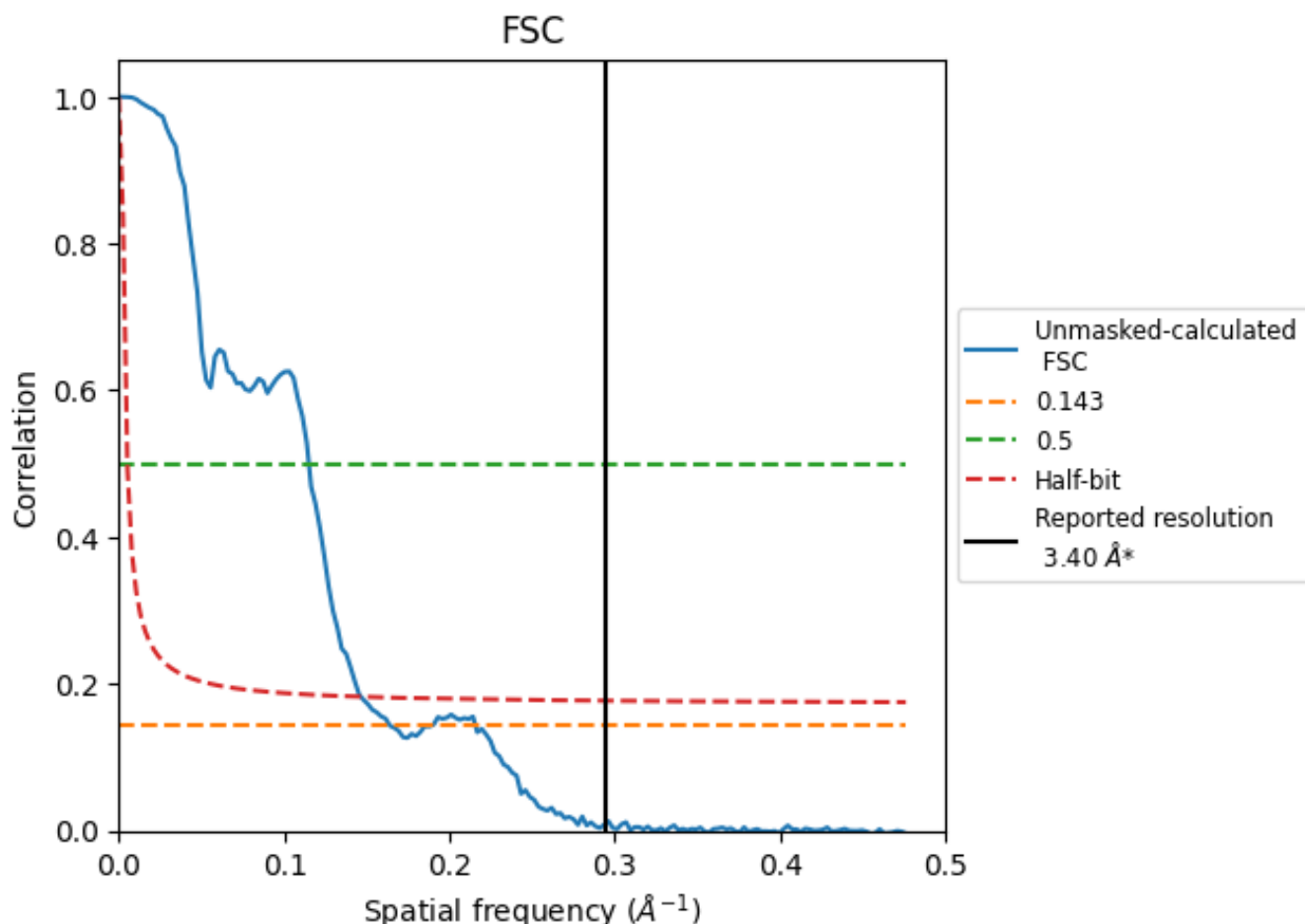


*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

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 0.294 Å⁻¹

8.2 Resolution estimates [i](#)

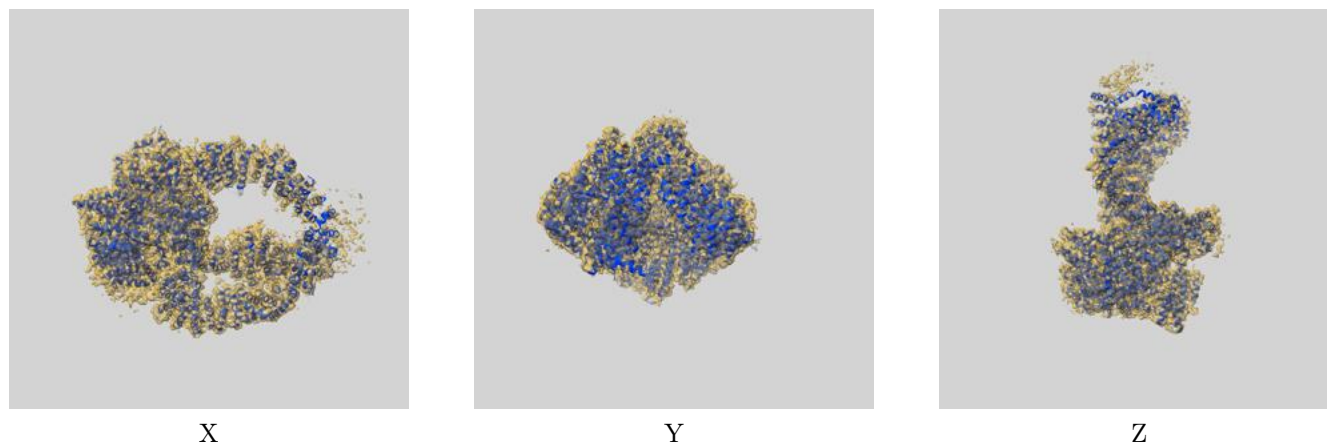
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.10	8.70	6.83

*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 6.10 differs from the reported value 3.4 by more than 10 %

9 Map-model fit [i](#)

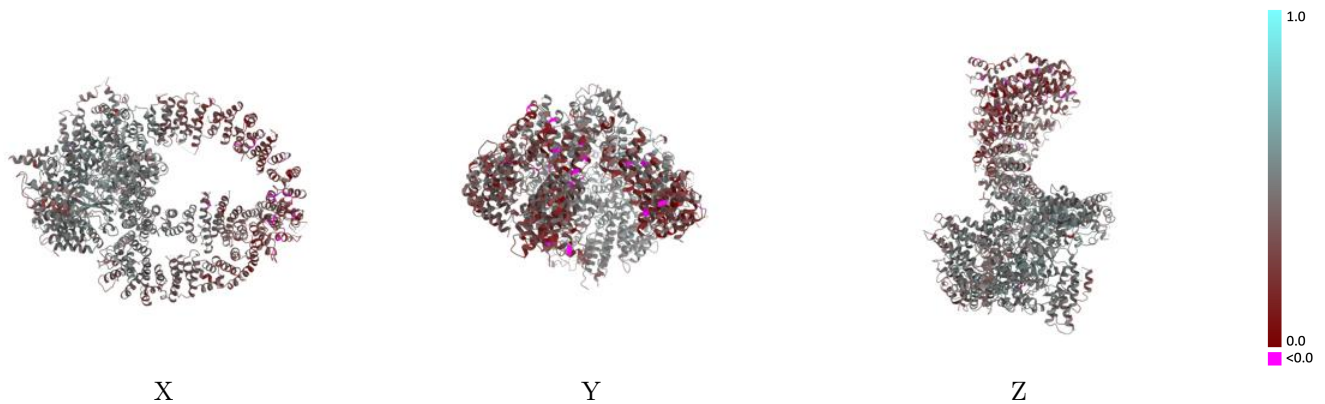
This section contains information regarding the fit between EMDB map EMD-45176 and PDB model 9C47. Per-residue inclusion information can be found in section [3](#) on page [4](#).

9.1 Map-model overlay [i](#)



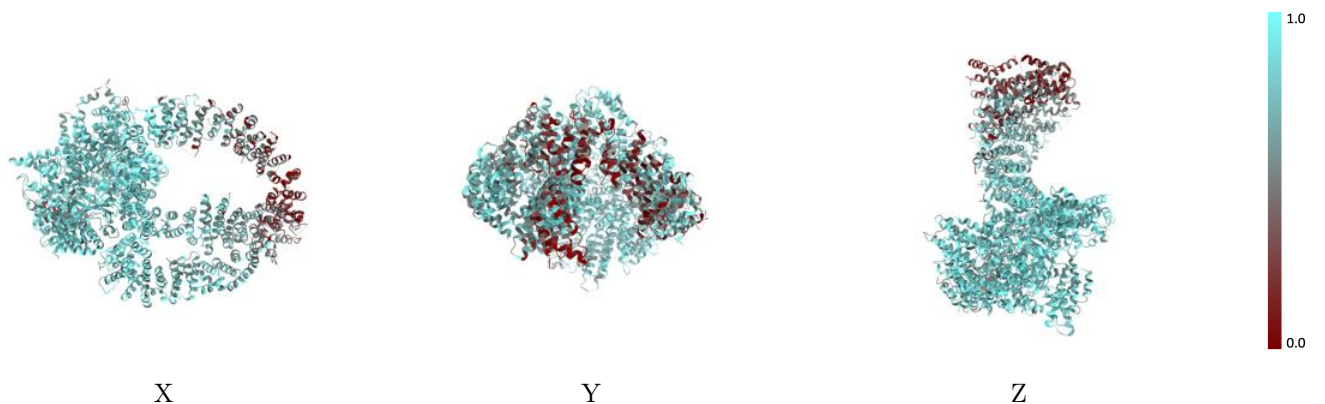
The images above show the 3D surface view of the map at the recommended contour level 0.451 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



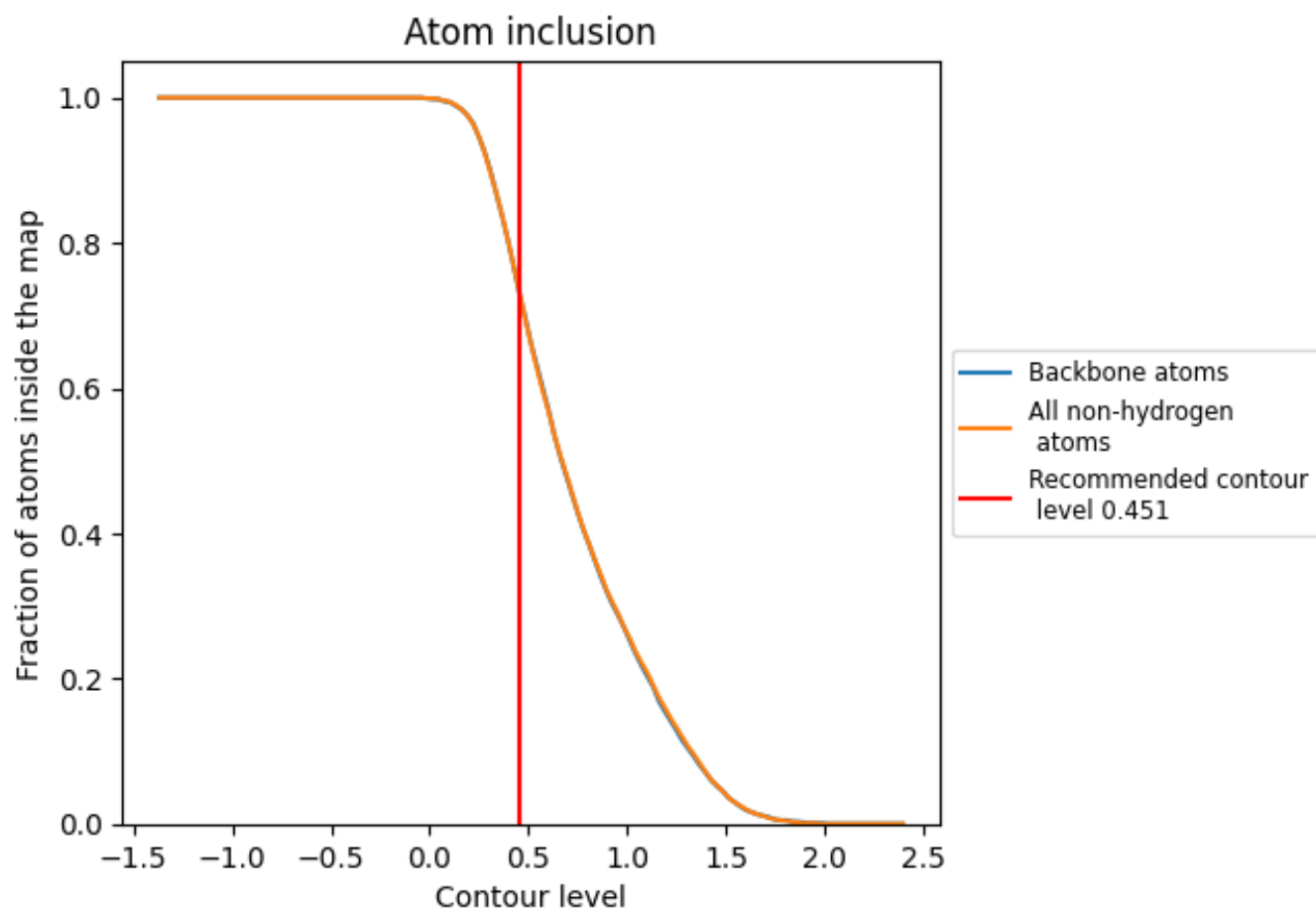
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.451).






9.4 Atom inclusion [i](#)



At the recommended contour level, 73% of all backbone atoms, 74% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.451) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7360	 0.4200
C	 0.7460	 0.4200
G	 0.7250	 0.4210

