



Full wwPDB EM Validation Report ⓘ

Oct 18, 2026 – 05:37 PM JST

PDB ID : 21RW / pdb_000021rw
EMDB ID : EMD-67953
Title : cryoEM structure of PROTEIN TANC1
Authors : Xue, C.Y.; Liu, Z.M.; Liu, W.; Zhong, D.
Deposited on : 2025-12-23
Resolution : 3.40 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev133
MolProbity : 4-5-2 with Phenix2.2
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) : 2.51

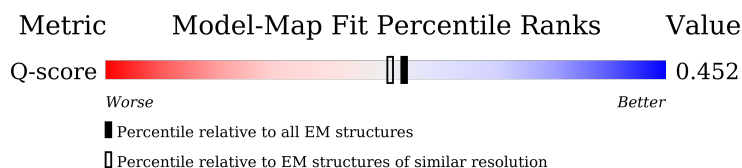
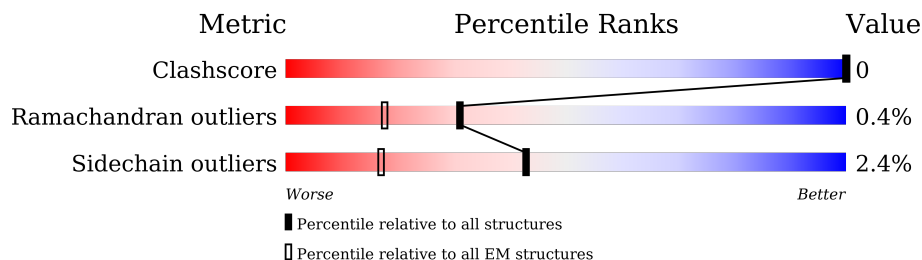
1 Overall quality at a glance

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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	14717 (2.90 - 3.90)

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	1856	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 11627 atoms, of which 5851 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 Protein TANC1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	738	11627	3673	5851	1023	1046	34	0	0

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

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, POINT, POINT, POINT	Depositor
Number of particles used	53000, 53000, 53000, 53000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF, FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION, PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI MORGAGNI	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.374	Depositor
Minimum map value	-0.239	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.009	Depositor
Recommended contour level	0.0298	Depositor
Map size ($\text{\AA}$)	189.36002, 189.36002, 189.36002	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing ($\text{\AA}$)	0.526, 0.526, 0.526	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	0.77	0/5886	1.33	12/7962 (0.2%)

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
1	A	0	2

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	648	PRO	CA-N-CD	-8.22	100.49	112.00
1	A	637	LEU	CA-C-N	5.59	126.83	119.84
1	A	637	LEU	C-N-CA	5.59	126.83	119.84
1	A	528	ARG	NE-CZ-NH2	5.56	124.20	119.20
1	A	834	ARG	NE-CZ-NH2	5.44	124.10	119.20
1	A	1143	ARG	NE-CZ-NH2	5.23	123.91	119.20
1	A	536	ARG	NE-CZ-NH2	5.23	123.91	119.20
1	A	616	PHE	CA-CB-CG	5.21	119.01	113.80
1	A	385	ARG	NE-CZ-NH2	5.13	123.82	119.20
1	A	1131	ARG	NE-CZ-NH2	5.13	123.81	119.20
1	A	1111	PRO	CA-C-N	5.04	125.32	119.47
1	A	1111	PRO	C-N-CA	5.04	125.32	119.47

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	584	TYR	Sidechain

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Mol	Chain	Res	Type	Group
1	A	701	TYR	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	A	5776	5851	5844	0	0
All	All	5776	5851	5844	0	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 0.

There are no clashes within the asymmetric unit.

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	724/1856 (39%)	691 (95%)	30 (4%)	3 (0%)	30 59

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	648	PRO
1	A	1068	VAL
1	A	617	PRO

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	628/1566 (40%)	613 (98%)	15 (2%)	43 62

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	398	ASN
1	A	405	ARG
1	A	486	ARG
1	A	492	VAL
1	A	531	GLN
1	A	551	LEU
1	A	648	PRO
1	A	662	GLN
1	A	750	ARG
1	A	792	MET
1	A	809	PHE
1	A	883	LEU
1	A	893	GLU
1	A	949	THR
1	A	1129	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	575	ASN
1	A	658	HIS
1	A	715	HIS
1	A	763	HIS
1	A	769	GLN
1	A	854	GLN
1	A	931	ASN
1	A	977	HIS
1	A	1010	HIS
1	A	1064	HIS

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.

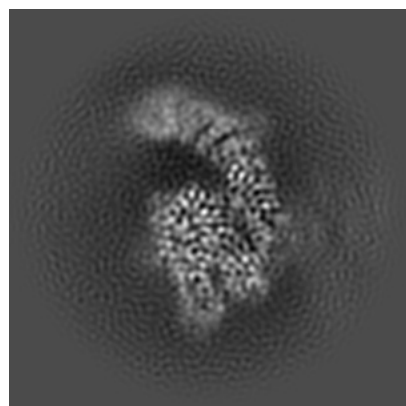
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-67953. These allow visual inspection of the internal detail of the map and identification of artifacts.

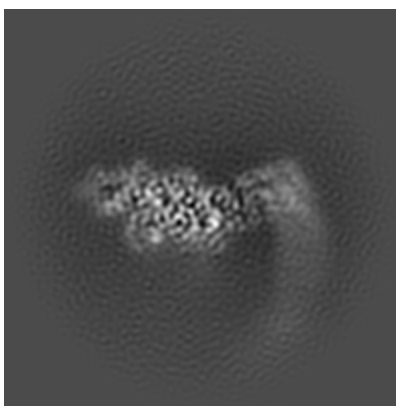
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

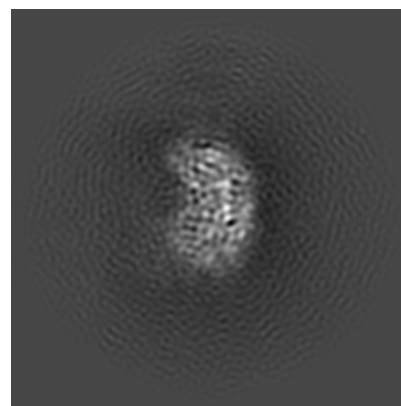
6.1.1 Primary map



X

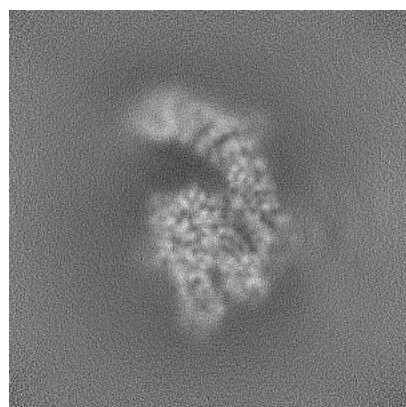


Y

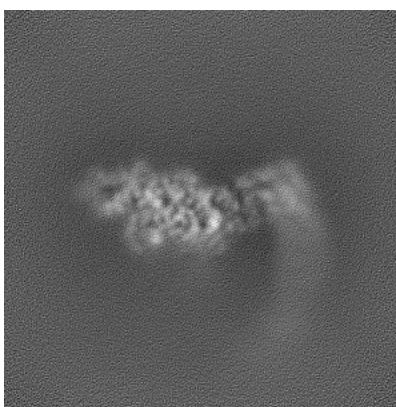


Z

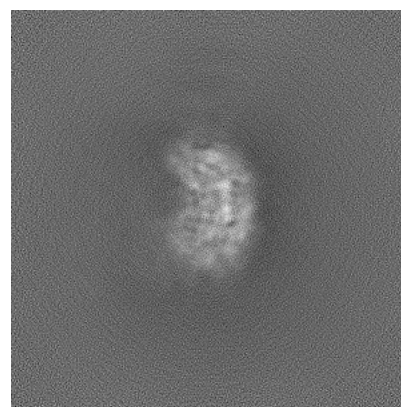
6.1.2 Raw map



X



Y

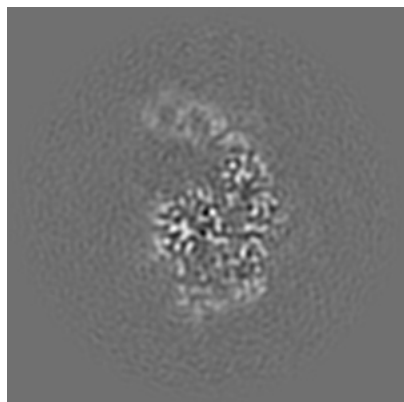


Z

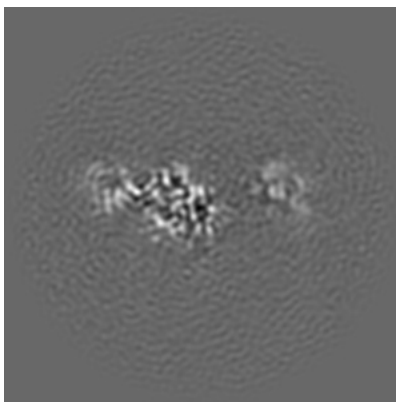
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

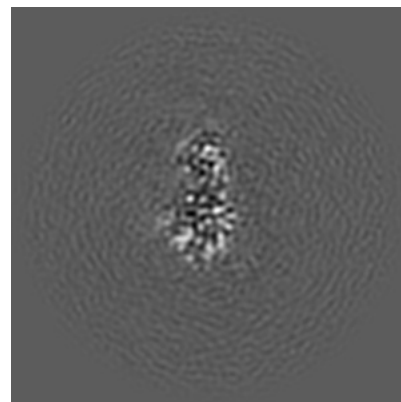
6.2.1 Primary map



X Index: 180

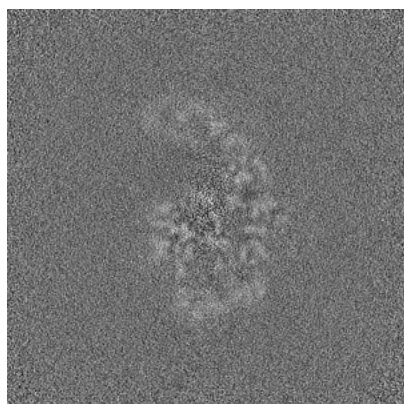


Y Index: 180

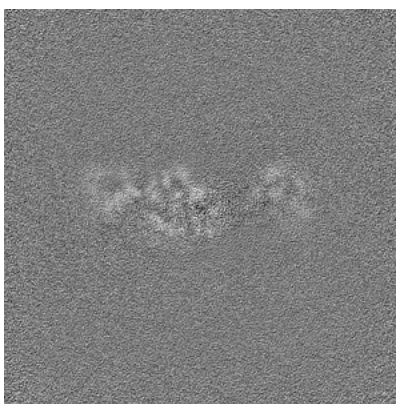


Z Index: 180

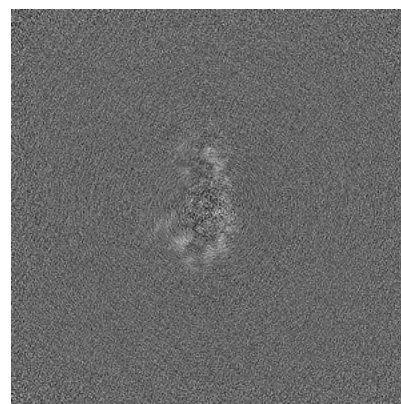
6.2.2 Raw map



X Index: 180



Y Index: 180

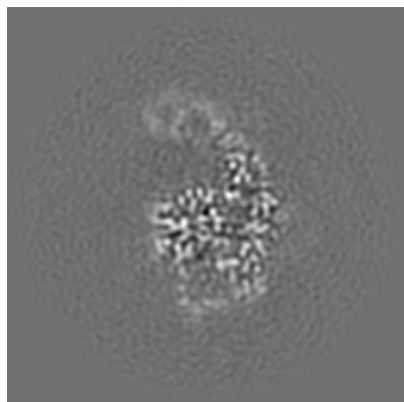


Z Index: 180

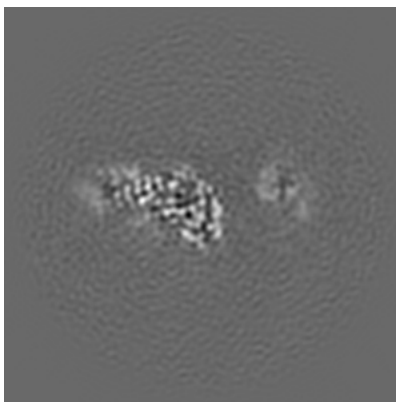
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

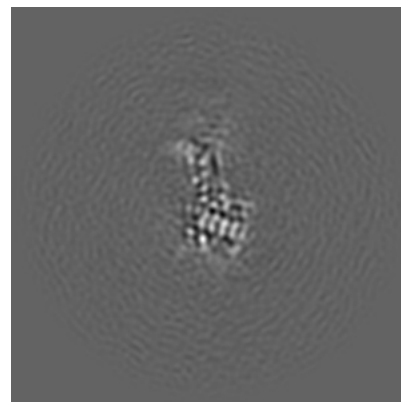
6.3.1 Primary map



X Index: 178

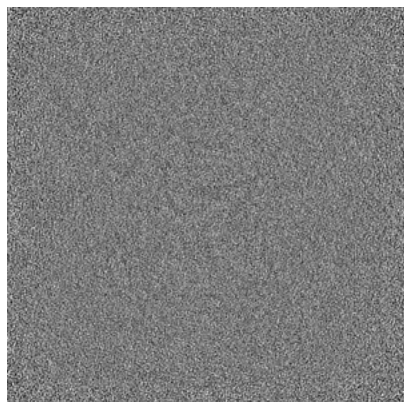


Y Index: 174

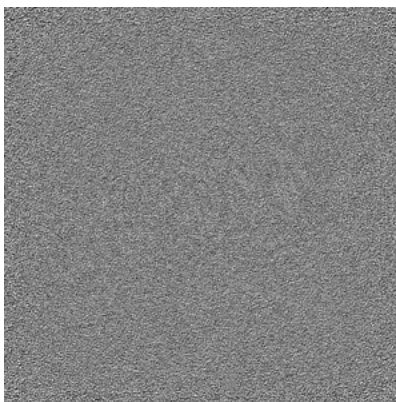


Z Index: 156

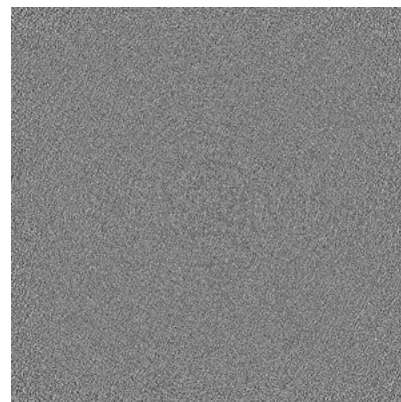
6.3.2 Raw map



X Index: 0



Y Index: 0

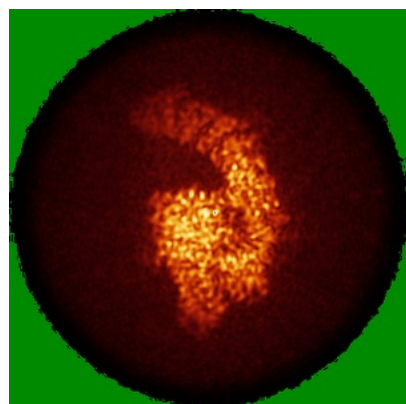


Z Index: 0

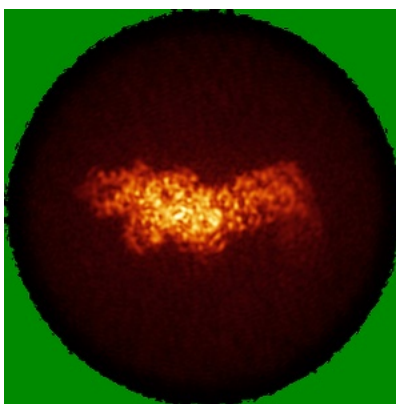
The images above show the largest variance slices of the map in three orthogonal directions.

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

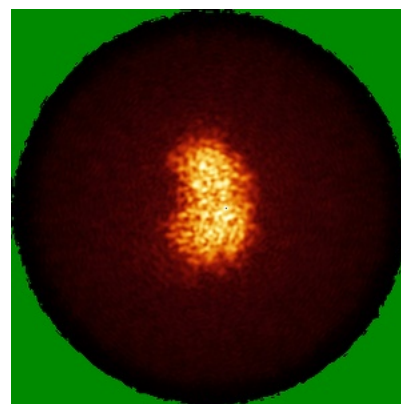
6.4.1 Primary map



X

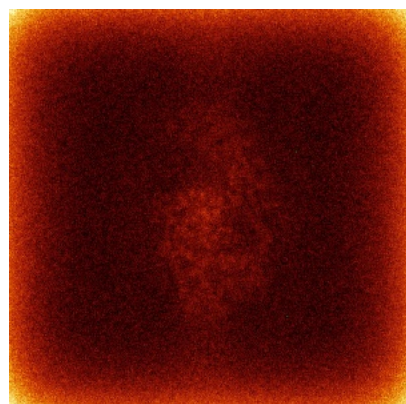


Y

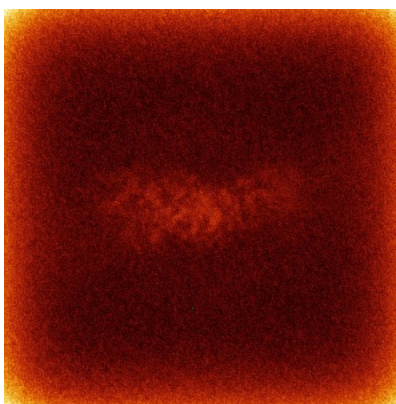


Z

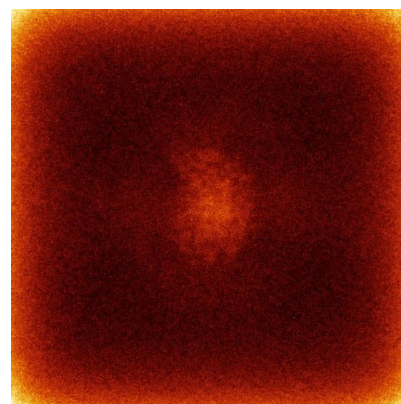
6.4.2 Raw map



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.

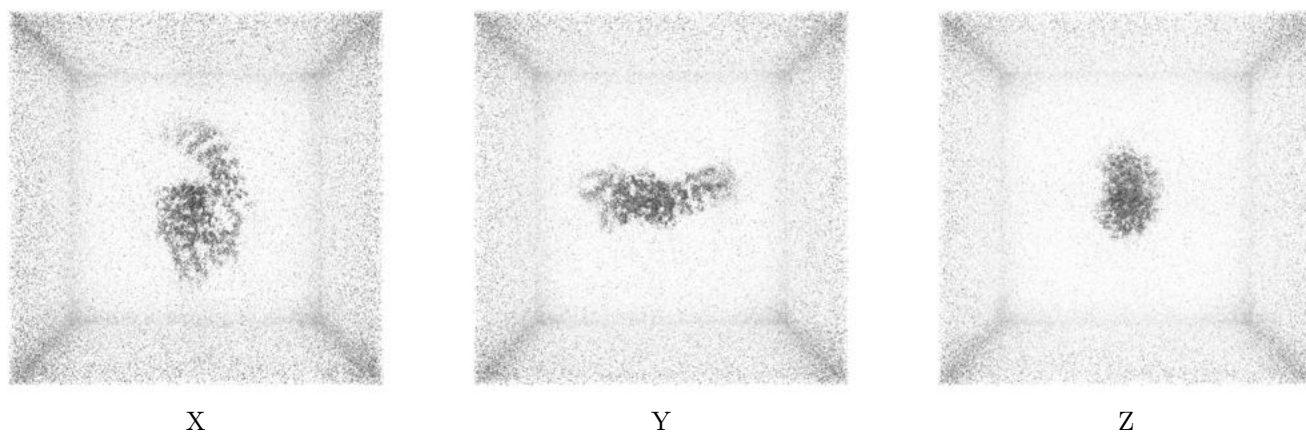
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.0298. 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.

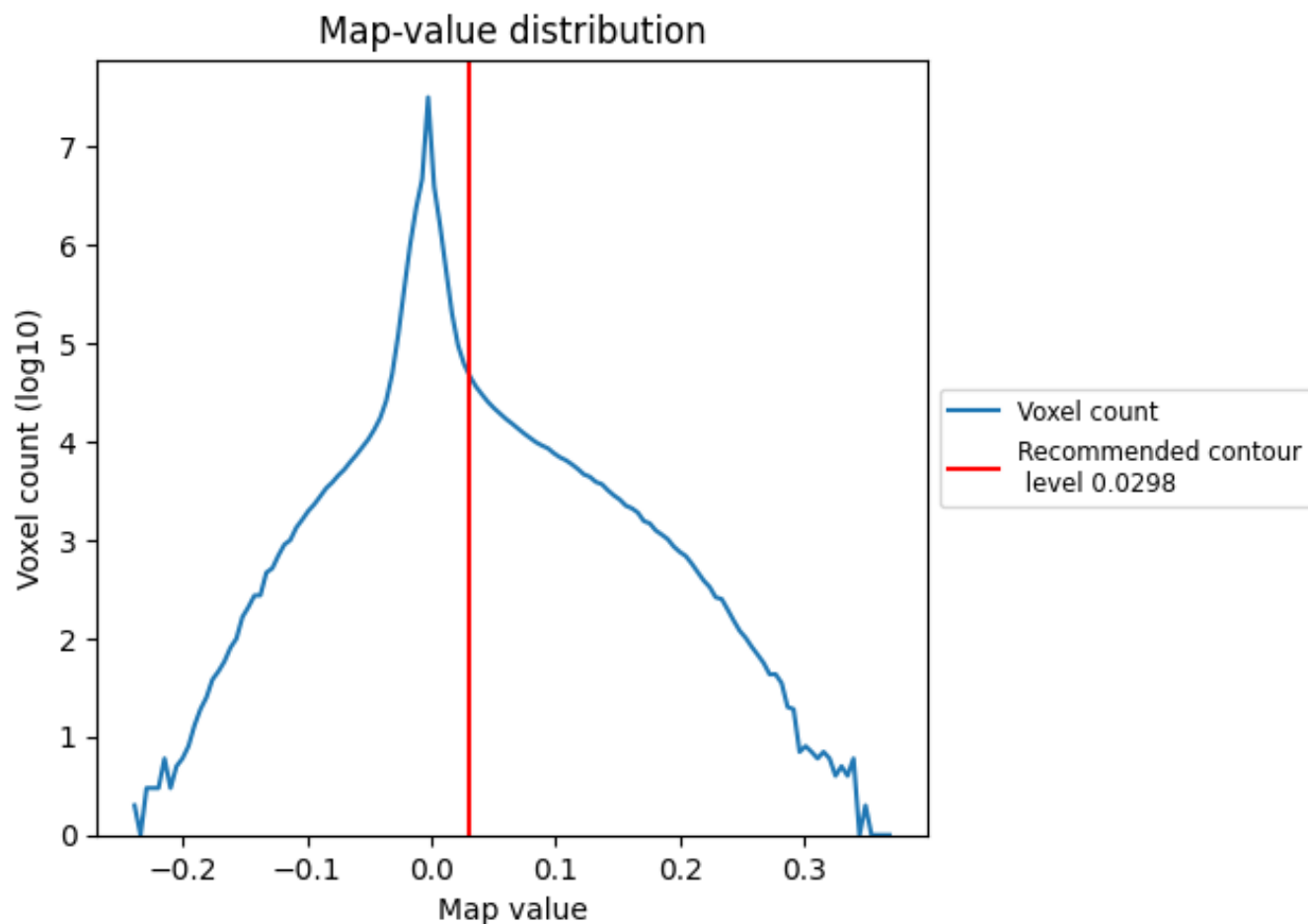
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

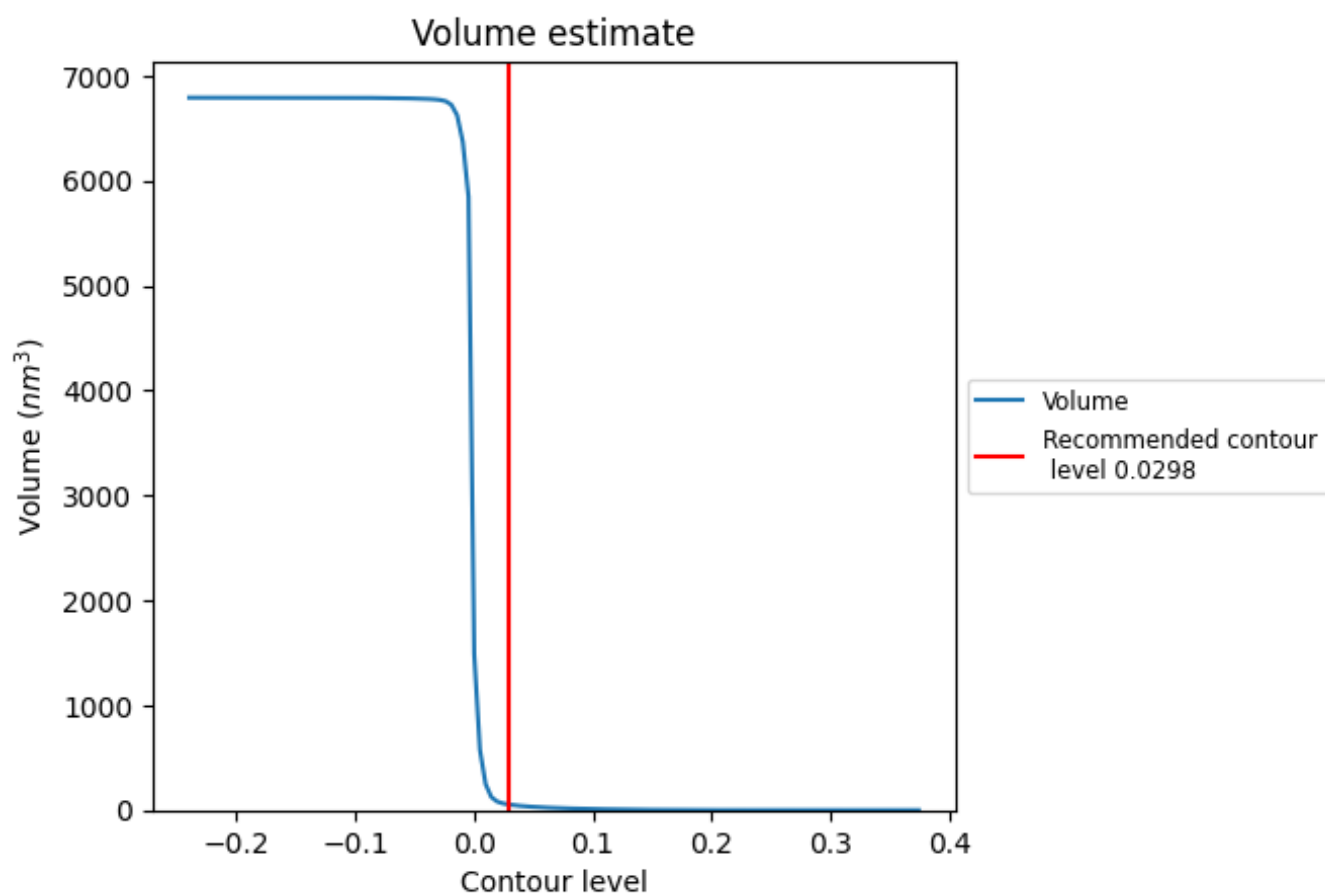
This section contains the results of statistical analysis of the map.

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.

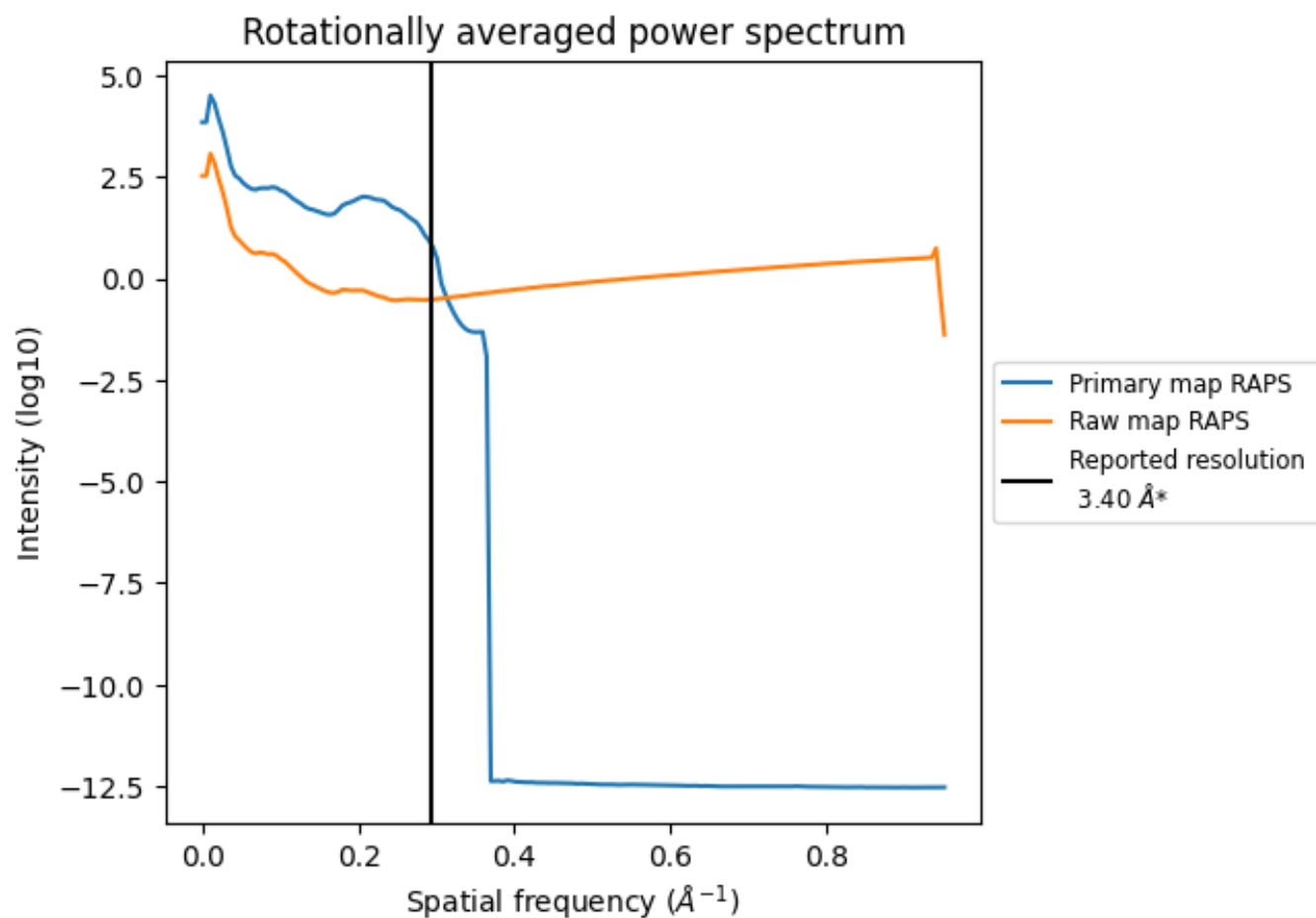
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 53 nm³; this corresponds to an approximate mass of 48 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 ⓘ

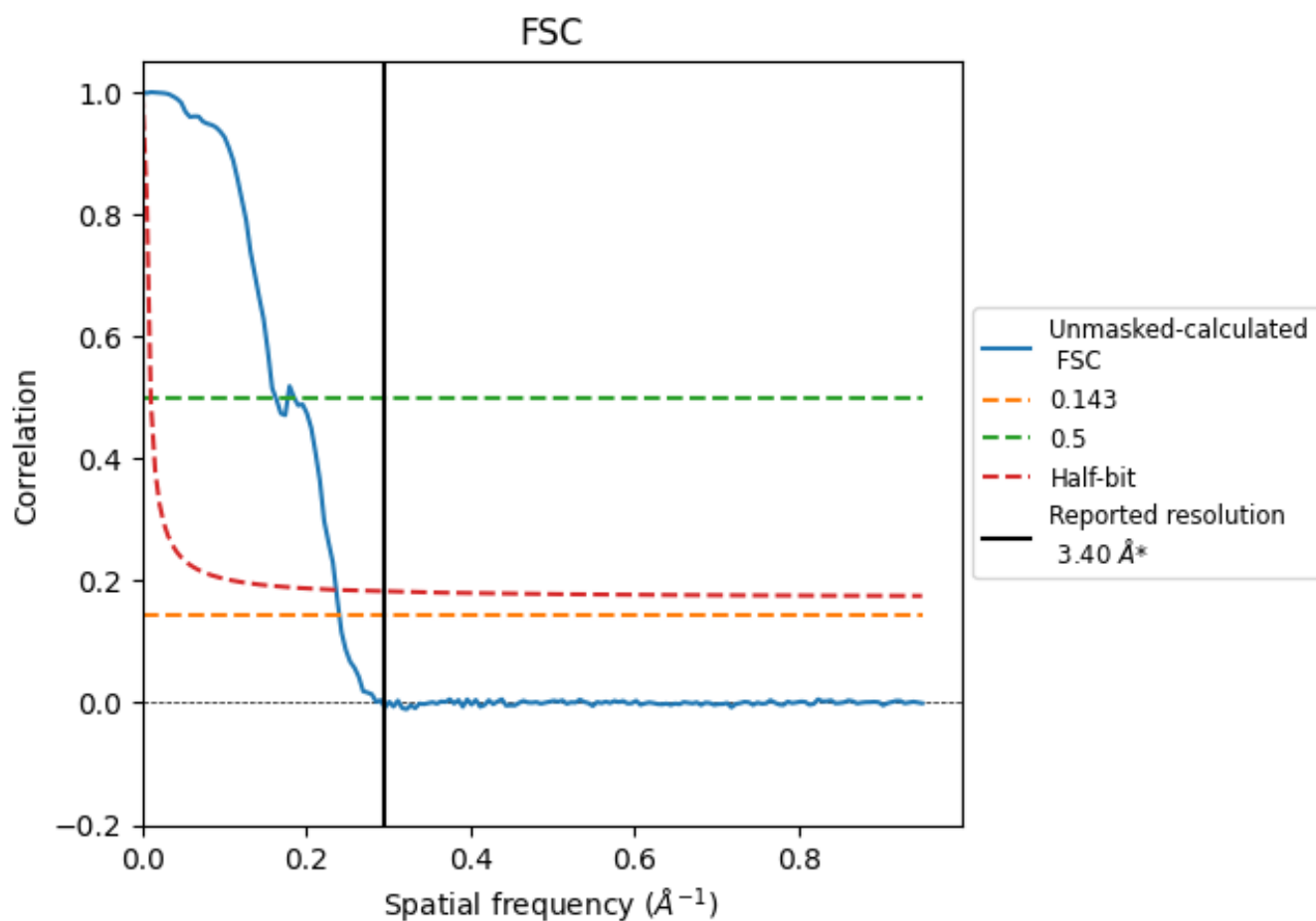


*Reported resolution corresponds to spatial frequency of 0.294 Å⁻¹

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 $0.294 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

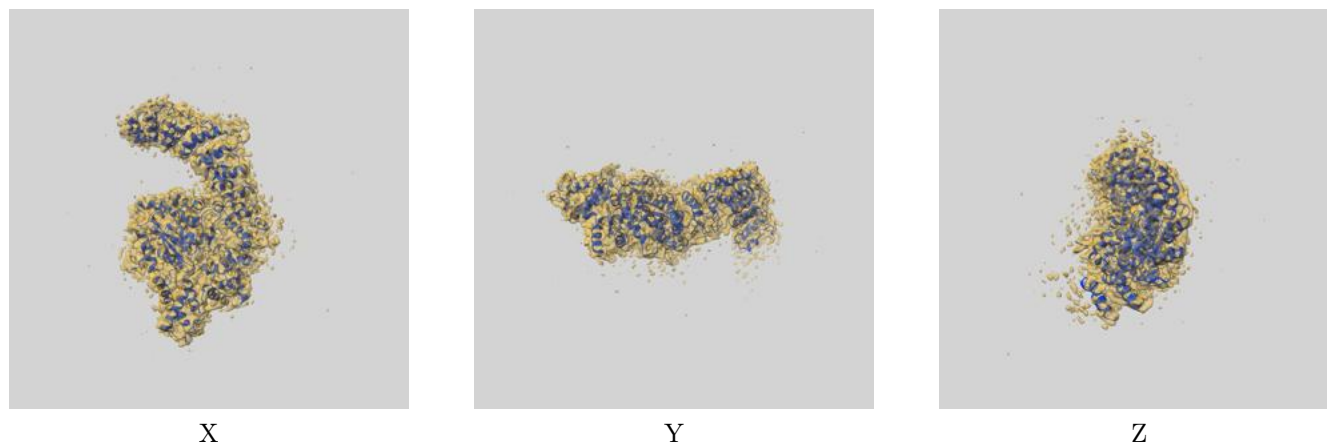
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	-	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.16	6.15	4.23

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

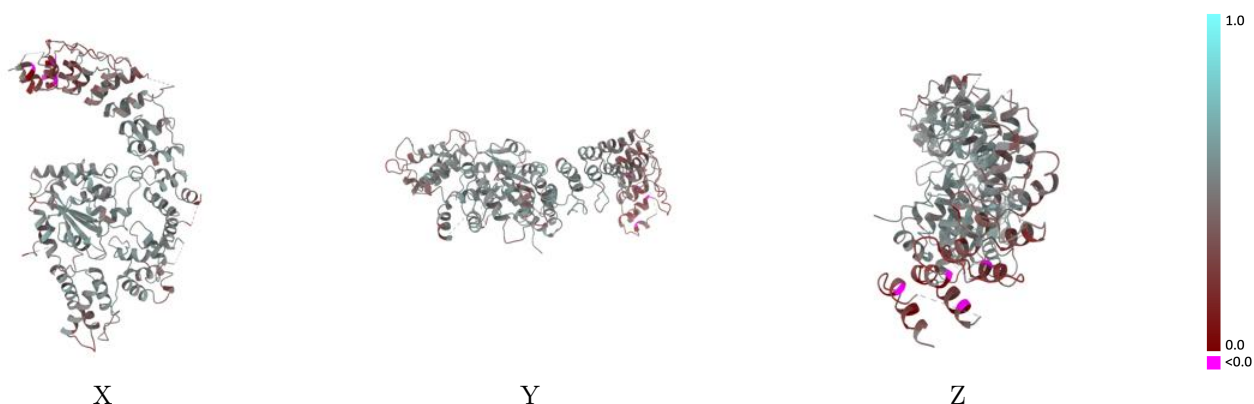
This section contains information regarding the fit between EMDB map EMD-67953 and PDB model 21RW. Per-residue inclusion information can be found in [section 3](#) on [page 4](#).

9.1 Map-model overlay [i](#)



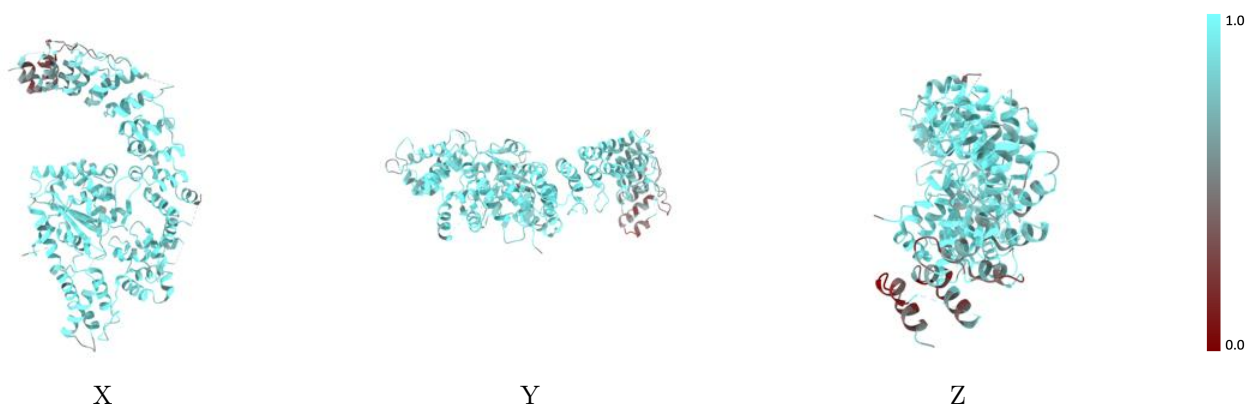
The images above show the 3D surface view of the map at the recommended contour level 0.0298 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



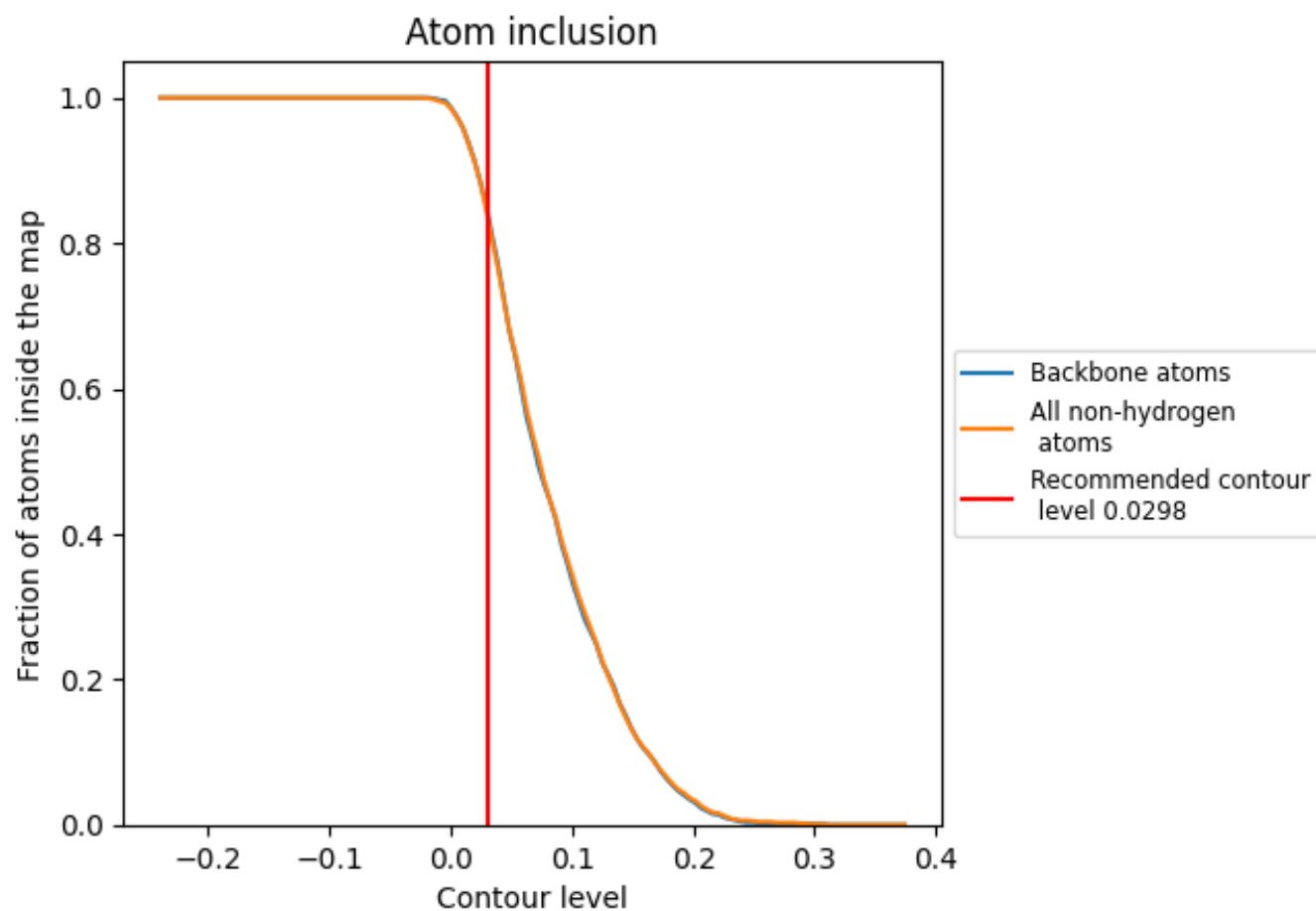
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.0298).

9.4 Atom inclusion [i](#)



At the recommended contour level, 85% of all backbone atoms, 84% 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 (0.0298) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8420	0.4520
A	0.8550	0.4520

