Full wwPDB EM Validation Report (i)

Apr 20, 2024 – 07:53 PM EDT

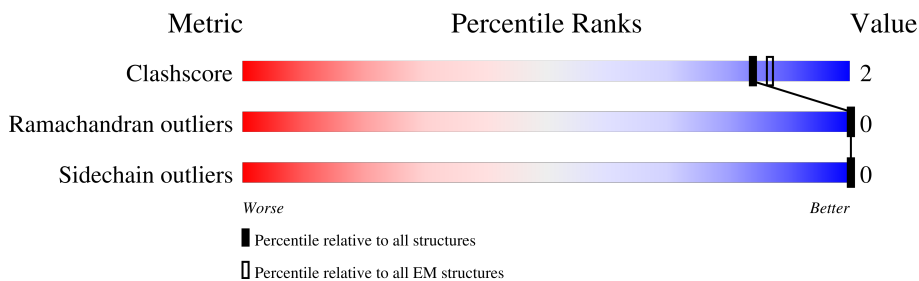|		
PDB ID	:	8GI8
EMDB ID	:	EMD-40062
Title	:	Kalium channelrhodopsin 1 from Hyphochytrium catenoides (HcKCR1) embedded in peptidisc
Authors	:	Morizumi, T.; Kim, K.; Li, H.; Spudich, J.L.; Ernst, O.P.
Deposited on	:	2023-03-13
Resolution	:	2.88 Å(reported)
Based on initial model	:	.

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.88 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	Percentile Ranks	Value
Clashscore		2
Ramachandran outliers		0
Sidechain outliers		0

Worse   *Better*

▮ Percentile relative to all structures

▯ Percentile relative to all EM structures

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	265	85% 6% 9%

2　Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 2330 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 Kalium Channelrhodopsin 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	240	Total 1955	C 1322	N 297	O 316	S 20	0	0

- Molecule 2 is RETINAL (three-letter code: RET) (formula: $C_{20}H_{28}O$).

RET
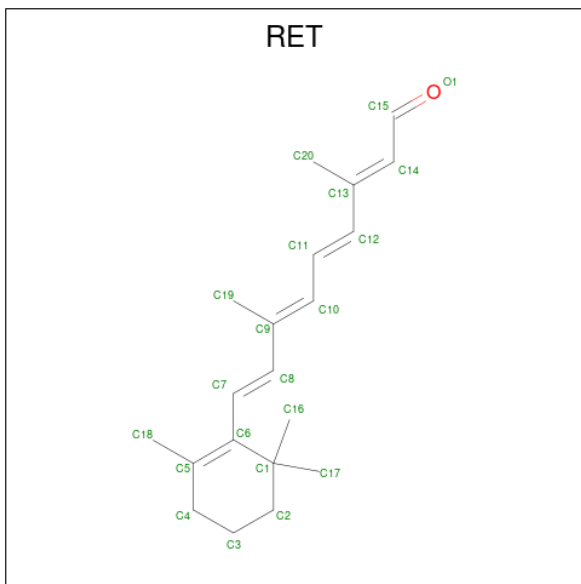
Mol	Chain	Residues	Atoms		AltConf
2	A	1	Total 20	C 20	0

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total 1	Na 1	0

- Molecule 4 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).

CLR
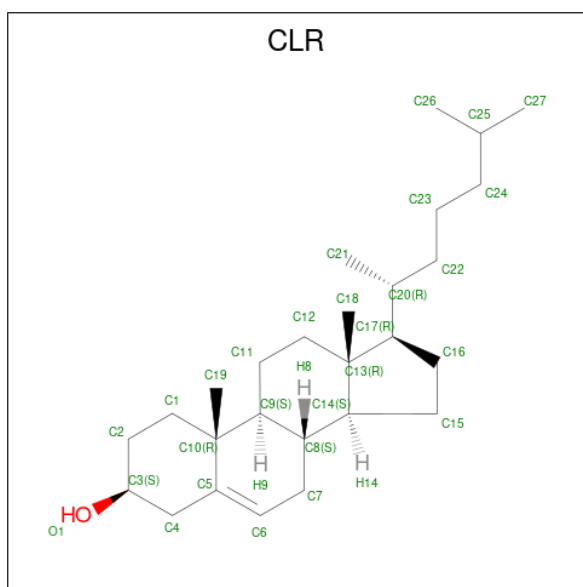
Mol	Chain	Residues	Atoms			AltConf
4	A	1	Total 28	C 27	O 1	0
4	A	1	Total 28	C 27	O 1	0
4	A	1	Total 28	C 27	O 1	0

- Molecule 5 is 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine (three-letter code: PEE) (formula: $C_{41}H_{78}NO_8P$).

PEE
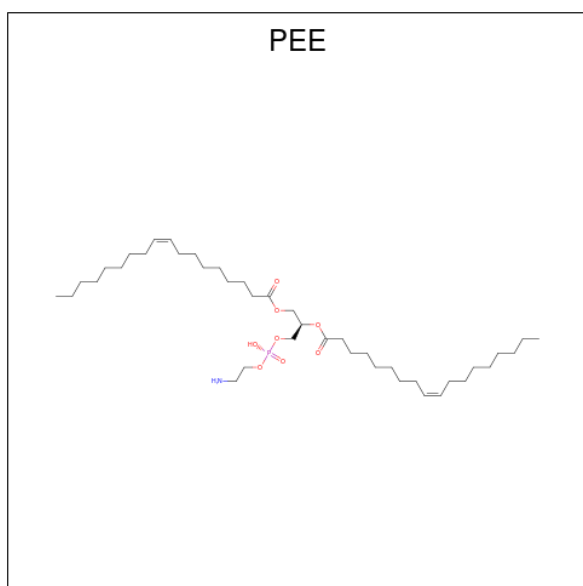
Mol	Chain	Residues	Atoms					AltConf
5	A	1	Total 51	C 41	N 1	O 8	P 1	0
5	A	1	Total 51	C 41	N 1	O 8	P 1	0
5	A	1	Total 51	C 41	N 1	O 8	P 1	0
5	A	1	Total 51	C 41	N 1	O 8	P 1	0
5	A	1	Total 51	C 41	N 1	O 8	P 1	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		AltConf
6	A	15	Total 15	O 15	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: Kalium Channelrhodopsin 1
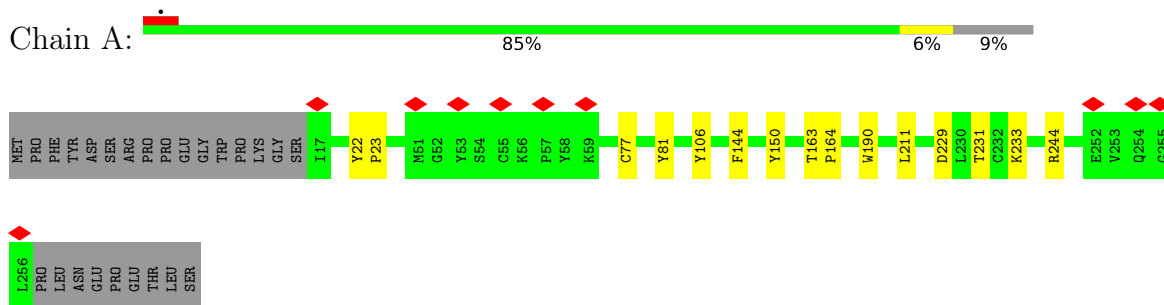
4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C3	Depositor
Number of particles used	297015	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 $(e^-/\text{Å}^2)$	40	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	75000	Depositor
Image detector	OTHER	Depositor
Maximum map value	8.934	Depositor
Minimum map value	-5.782	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.179	Depositor
Recommended contour level	0.6	Depositor
Map size (Å)	263.68, 263.68, 263.68	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.03, 1.03, 1.03	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: NA, RET, CLR, PEE

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	0.27	0/2030	0.41	0/2765

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 (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	1955	0	1908	10	0
2	A	20	0	27	2	0
3	A	1	0	0	0	0
4	A	84	0	138	2	0
5	A	255	0	410	1	0
6	A	15	0	0	1	0
All	All	2330	0	2483	11	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 2.

All (11) 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)
1:A:150:TYR:OH	5:A:308:PEE:O5	2.22	0.53
2:A:301:RET:H8	2:A:301:RET:H161	1.94	0.49
1:A:77:CYS:SG	1:A:233:LYS:HD2	2.54	0.48
1:A:231:THR:HG23	4:A:303:CLR:C18	2.46	0.46
1:A:81:TYR:OH	1:A:229:ASP:OD2	2.24	0.44
1:A:22:TYR:N	1:A:23:PRO:HD2	2.33	0.43
1:A:106:TYR:CD2	2:A:301:RET:H14	2.53	0.43
1:A:163:THR:HB	1:A:164:PRO:HD3	2.01	0.42
1:A:190:TRP:CZ3	4:A:303:CLR:H6	2.55	0.41
1:A:244:ARG:NH1	6:A:401:HOH:O	2.24	0.41
1:A:144:PHE:HD1	1:A:211:LEU:HD11	1.86	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	238/265 (90%)	233 (98%)	5 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	206/229 (90%)	206 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 10 ligands modelled in this entry, 1 is monoatomic - leaving 9 for Mogul analysis.

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	$\#|Z| > 2$
5	PEE	A	307	-	50,50,50	1.27	3 (6%)	53,55,55	0.92	1 (1%)
5	PEE	A	309	-	50,50,50	1.25	5 (10%)	53,55,55	0.91	1 (1%)
4	CLR	A	304	-	31,31,31	1.06	1 (3%)	48,48,48	1.30	5 (10%)
5	PEE	A	308	-	50,50,50	1.25	4 (8%)	53,55,55	0.91	1 (1%)
4	CLR	A	303	-	31,31,31	1.10	2 (6%)	48,48,48	1.30	7 (14%)
2	RET	A	301	1	20,20,21	1.33	2 (10%)	27,27,28	1.47	5 (18%)
4	CLR	A	305	-	31,31,31	1.08	2 (6%)	48,48,48	1.36	6 (12%)
5	PEE	A	310	-	50,50,50	1.26	5 (10%)	53,55,55	0.91	1 (1%)
5	PEE	A	306	-	50,50,50	1.31	4 (8%)	53,55,55	0.90	1 (1%)

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
5	PEE	A	307	-	-	26/54/54/54	-
5	PEE	A	309	-	-	23/54/54/54	-
4	CLR	A	304	-	-	0/10/68/68	0/4/4/4
5	PEE	A	308	-	-	29/54/54/54	-
4	CLR	A	303	-	-	2/10/68/68	0/4/4/4
2	RET	A	301	1	-	0/13/30/31	0/1/1/1
4	CLR	A	305	-	-	3/10/68/68	0/4/4/4
5	PEE	A	310	-	-	26/54/54/54	-
5	PEE	A	306	-	-	27/54/54/54	-

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	307	PEE	P-O4P	4.66	1.78	1.59
5	A	306	PEE	P-O4P	4.62	1.78	1.59
5	A	308	PEE	P-O4P	4.58	1.77	1.59
5	A	310	PEE	P-O4P	4.54	1.77	1.59
5	A	309	PEE	P-O4P	4.49	1.77	1.59
2	A	301	RET	C2-C3	-4.44	1.41	1.52
5	A	306	PEE	C39-C38	4.13	1.55	1.31
5	A	307	PEE	C39-C38	3.84	1.54	1.31
5	A	310	PEE	C18-C19	3.76	1.53	1.31
5	A	310	PEE	C39-C38	3.74	1.53	1.31
5	A	308	PEE	C39-C38	3.71	1.53	1.31
5	A	309	PEE	C18-C19	3.71	1.53	1.31
5	A	309	PEE	C39-C38	3.65	1.52	1.31
5	A	306	PEE	C18-C19	3.64	1.52	1.31
5	A	307	PEE	C18-C19	3.59	1.52	1.31
5	A	308	PEE	C18-C19	3.54	1.52	1.31
4	A	303	CLR	C18-C13	-2.31	1.50	1.54
4	A	305	CLR	C8-C14	-2.23	1.49	1.53
2	A	301	RET	C1-C6	2.22	1.56	1.53
4	A	304	CLR	C18-C13	-2.22	1.50	1.54
5	A	308	PEE	O4P-C4	-2.13	1.36	1.44
4	A	305	CLR	C18-C13	-2.10	1.50	1.54
5	A	309	PEE	O4P-C4	-2.06	1.36	1.44
4	A	303	CLR	C7-C6	2.04	1.54	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	310	PEE	O2-C2	-2.04	1.41	1.46
5	A	310	PEE	O4P-C4	-2.03	1.36	1.44
5	A	306	PEE	O4P-C4	-2.01	1.36	1.44
5	A	309	PEE	C1-C2	2.00	1.56	1.50

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	A	308	PEE	O2P-P-O1P	4.27	133.37	112.24
5	A	310	PEE	O2P-P-O1P	4.26	133.31	112.24
5	A	307	PEE	O2P-P-O1P	4.26	133.30	112.24
5	A	306	PEE	O2P-P-O1P	4.22	133.12	112.24
5	A	309	PEE	O2P-P-O1P	4.18	132.90	112.24
2	A	301	RET	C16-C1-C6	3.85	116.55	110.30
4	A	305	CLR	C22-C20-C17	-3.45	103.16	110.28
4	A	304	CLR	C22-C20-C17	-3.23	103.62	110.28
4	A	303	CLR	C22-C20-C17	-3.09	103.89	110.28
4	A	304	CLR	C16-C17-C20	-2.65	108.04	112.15
4	A	305	CLR	C7-C8-C14	-2.64	107.08	110.91
4	A	303	CLR	C7-C8-C14	-2.55	107.21	110.91
4	A	303	CLR	C18-C13-C12	2.42	114.41	110.59
4	A	305	CLR	C12-C13-C14	-2.40	103.55	107.27
4	A	304	CLR	C7-C8-C14	-2.37	107.48	110.91
4	A	305	CLR	C16-C17-C20	-2.30	108.58	112.15
4	A	305	CLR	C4-C5-C6	-2.28	117.32	120.61
2	A	301	RET	C16-C1-C2	-2.23	99.99	108.91
4	A	303	CLR	C9-C10-C5	-2.20	106.20	109.65
2	A	301	RET	C18-C5-C6	2.17	126.97	124.53
4	A	304	CLR	C18-C13-C12	2.16	114.00	110.59
4	A	303	CLR	C4-C5-C6	-2.13	117.54	120.61
2	A	301	RET	C17-C1-C6	2.12	113.73	110.30
2	A	301	RET	C18-C5-C4	-2.11	109.56	113.62
4	A	303	CLR	C12-C13-C14	-2.10	104.01	107.27
4	A	303	CLR	C16-C17-C20	-2.07	108.94	112.15
4	A	304	CLR	C12-C13-C14	-2.06	104.07	107.27
4	A	305	CLR	C18-C13-C12	2.05	113.83	110.59

There are no chirality outliers.

All (136) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	306	PEE	C4-O4P-P-O3P

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Mol	Chain	Res	Type	Atoms
5	A	306	PEE	O4P-C4-C5-N
5	A	307	PEE	C1-O3P-P-O2P
5	A	307	PEE	C4-O4P-P-O2P
5	A	307	PEE	O4P-C4-C5-N
5	A	308	PEE	C11-C10-O2-C2
5	A	308	PEE	O4-C10-O2-C2
5	A	308	PEE	C1-O3P-P-O1P
5	A	309	PEE	C2-C1-O3P-P
5	A	309	PEE	C1-O3P-P-O1P
5	A	309	PEE	C4-O4P-P-O1P
5	A	310	PEE	C1-O3P-P-O2P
5	A	310	PEE	O4P-C4-C5-N
5	A	306	PEE	O5-C30-O3-C3
5	A	306	PEE	C31-C30-O3-C3
5	A	308	PEE	C17-C18-C19-C20
5	A	309	PEE	C17-C18-C19-C20
5	A	307	PEE	C42-C43-C44-C45
5	A	306	PEE	C22-C23-C24-C25
4	A	305	CLR	C22-C23-C24-C25
5	A	308	PEE	C10-C11-C12-C13
5	A	308	PEE	C30-C31-C32-C33
5	A	309	PEE	C10-C11-C12-C13
5	A	307	PEE	C10-C11-C12-C13
5	A	310	PEE	C30-C31-C32-C33
4	A	303	CLR	C22-C23-C24-C25
5	A	306	PEE	C17-C18-C19-C20
5	A	310	PEE	C17-C18-C19-C20
5	A	307	PEE	C4-O4P-P-O3P
5	A	310	PEE	C1-O3P-P-O4P
5	A	309	PEE	C31-C30-O3-C3
5	A	309	PEE	C22-C23-C24-C25
5	A	306	PEE	C11-C10-O2-C2
5	A	309	PEE	C21-C22-C23-C24
5	A	309	PEE	C11-C12-C13-C14
5	A	307	PEE	C22-C23-C24-C25
5	A	310	PEE	C13-C14-C15-C16
5	A	306	PEE	O4-C10-O2-C2
5	A	309	PEE	O5-C30-O3-C3
5	A	309	PEE	C34-C35-C36-C37
5	A	309	PEE	C43-C44-C45-C46
5	A	306	PEE	C31-C32-C33-C34
5	A	310	PEE	C21-C22-C23-C24

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Mol	Chain	Res	Type	Atoms
5	A	306	PEE	C13-C14-C15-C16
5	A	307	PEE	C13-C14-C15-C16
5	A	308	PEE	C19-C20-C21-C22
5	A	309	PEE	C31-C32-C33-C34
5	A	306	PEE	C34-C35-C36-C37
5	A	308	PEE	C33-C34-C35-C36
5	A	308	PEE	C31-C32-C33-C34
5	A	309	PEE	C41-C42-C43-C44
5	A	308	PEE	C43-C44-C45-C46
5	A	310	PEE	C43-C44-C45-C46
5	A	308	PEE	C22-C23-C24-C25
5	A	310	PEE	C31-C32-C33-C34
5	A	306	PEE	C39-C40-C41-C42
5	A	308	PEE	C31-C30-O3-C3
5	A	306	PEE	C43-C44-C45-C46
5	A	309	PEE	O2-C2-C3-O3
5	A	307	PEE	C17-C18-C19-C20
5	A	307	PEE	C40-C41-C42-C43
5	A	308	PEE	C40-C41-C42-C43
5	A	308	PEE	C42-C43-C44-C45
5	A	308	PEE	C39-C40-C41-C42
5	A	307	PEE	C1-C2-C3-O3
5	A	308	PEE	O5-C30-O3-C3
5	A	307	PEE	C24-C25-C26-C27
5	A	307	PEE	C19-C20-C21-C22
4	A	303	CLR	C20-C22-C23-C24
5	A	310	PEE	C37-C38-C39-C40
5	A	307	PEE	C11-C12-C13-C14
5	A	308	PEE	C24-C25-C26-C27
5	A	308	PEE	C12-C13-C14-C15
5	A	308	PEE	C41-C42-C43-C44
5	A	308	PEE	C37-C38-C39-C40
5	A	307	PEE	O3P-C1-C2-C3
5	A	309	PEE	O3P-C1-C2-C3
5	A	306	PEE	C40-C41-C42-C43
5	A	310	PEE	C12-C13-C14-C15
5	A	310	PEE	C34-C35-C36-C37
5	A	310	PEE	C4-O4P-P-O3P
5	A	309	PEE	O3P-C1-C2-O2
5	A	307	PEE	O2-C2-C3-O3
5	A	306	PEE	C37-C38-C39-C40
5	A	306	PEE	C2-C1-O3P-P

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Mol	Chain	Res	Type	Atoms
5	A	310	PEE	C22-C23-C24-C25
5	A	309	PEE	C40-C41-C42-C43
5	A	306	PEE	O3P-C1-C2-C3
5	A	309	PEE	C1-C2-C3-O3
5	A	306	PEE	O3P-C1-C2-O2
5	A	307	PEE	O3P-C1-C2-O2
5	A	310	PEE	C33-C34-C35-C36
5	A	307	PEE	C20-C21-C22-C23
5	A	306	PEE	C42-C43-C44-C45
5	A	308	PEE	C11-C12-C13-C14
5	A	308	PEE	C1-O3P-P-O4P
5	A	306	PEE	C4-O4P-P-O2P
5	A	310	PEE	C1-O3P-P-O1P
5	A	310	PEE	C4-O4P-P-O2P
4	A	305	CLR	C21-C20-C22-C23
5	A	310	PEE	O4-C10-O2-C2
5	A	310	PEE	C11-C10-O2-C2
5	A	306	PEE	C35-C36-C37-C38
5	A	310	PEE	C42-C43-C44-C45
5	A	306	PEE	C1-C2-O2-C10
5	A	306	PEE	C23-C24-C25-C26
5	A	306	PEE	C1-O3P-P-O4P
5	A	309	PEE	C1-O3P-P-O4P
5	A	306	PEE	C15-C16-C17-C18
5	A	310	PEE	C11-C12-C13-C14
5	A	308	PEE	C36-C37-C38-C39
5	A	308	PEE	C13-C14-C15-C16
5	A	308	PEE	C35-C36-C37-C38
5	A	307	PEE	C34-C35-C36-C37
5	A	310	PEE	C23-C24-C25-C26
5	A	308	PEE	C32-C33-C34-C35
5	A	309	PEE	C37-C38-C39-C40
5	A	307	PEE	C37-C38-C39-C40
5	A	309	PEE	C16-C17-C18-C19
5	A	309	PEE	C30-C31-C32-C33
5	A	308	PEE	C23-C24-C25-C26
5	A	310	PEE	O2-C10-C11-C12
5	A	308	PEE	C38-C39-C40-C41
5	A	306	PEE	C16-C17-C18-C19
5	A	310	PEE	C16-C17-C18-C19
5	A	307	PEE	O2-C10-C11-C12
4	A	305	CLR	C20-C22-C23-C24

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Mol	Chain	Res	Type	Atoms
5	A	310	PEE	O4-C10-C11-C12
5	A	306	PEE	C1-O3P-P-O1P
5	A	307	PEE	O4-C10-C11-C12
5	A	310	PEE	C24-C25-C26-C27
5	A	307	PEE	C5-C4-O4P-P
5	A	308	PEE	C5-C4-O4P-P
5	A	307	PEE	C33-C34-C35-C36
5	A	307	PEE	C39-C40-C41-C42
5	A	307	PEE	C36-C37-C38-C39

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	308	PEE	1	0
4	A	303	CLR	2	0
2	A	301	RET	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand PEE A 307

Bond lengths

Bond angles

Torsions

Rings

Ligand PEE A 309

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 304

Bond lengths

Bond angles

Torsions

Rings

Ligand PEE A 308

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 303

Bond lengths

Bond angles

Torsions

Rings

Ligand RET A 301

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 305

Bond lengths

Bond angles

Torsions

Rings

Ligand PEE A 310

Bond lengths

Bond angles

Torsions

Rings

Ligand PEE A 306

Bond lengths

Bond angles

Torsions

Rings

5.7　Other polymers　ⓘ

There are no such residues in this entry.

5.8　Polymer linkage issues　ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-40062. 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 |
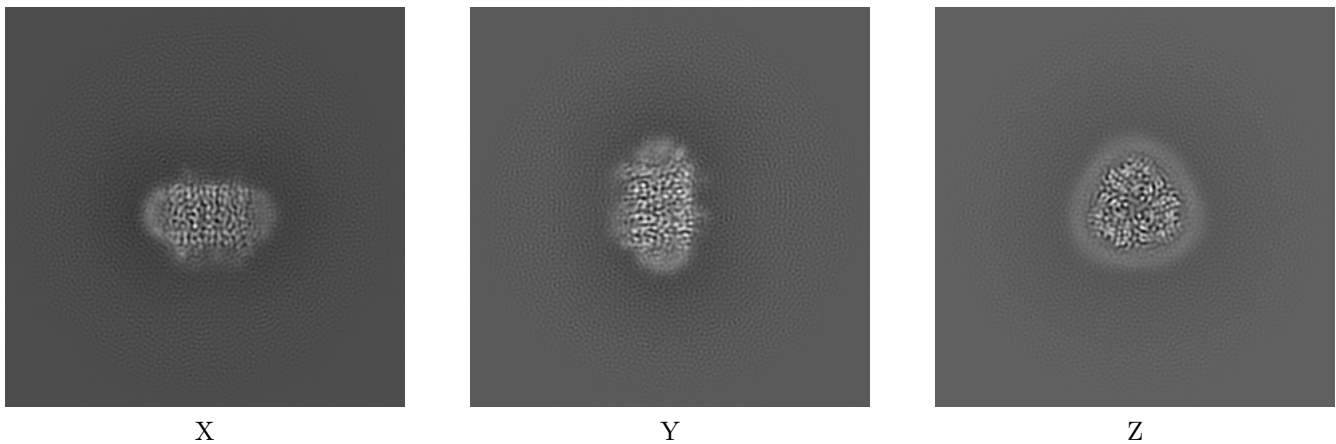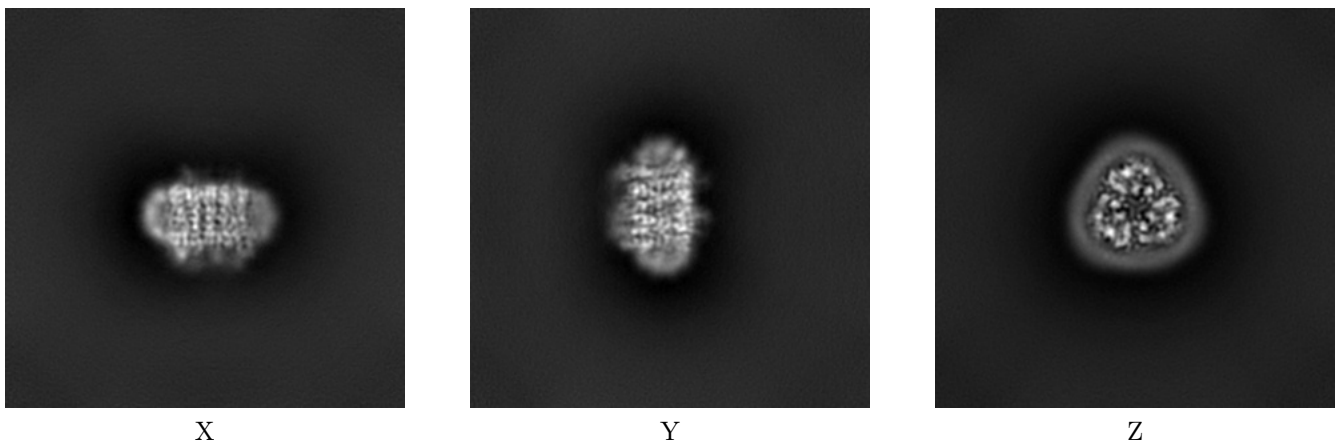
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
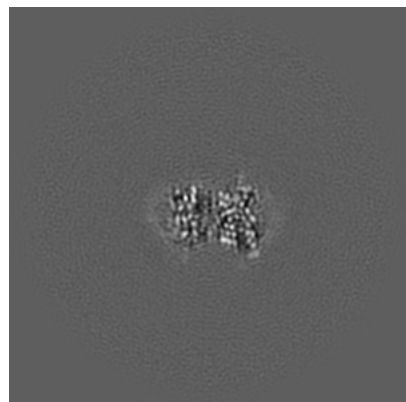
6.2.1 Primary map
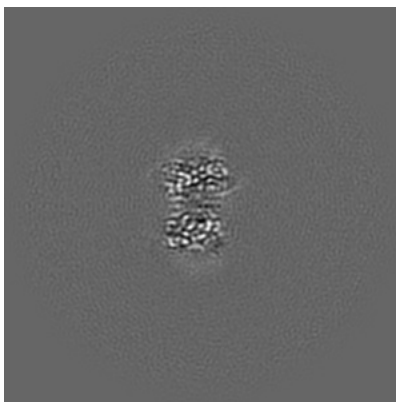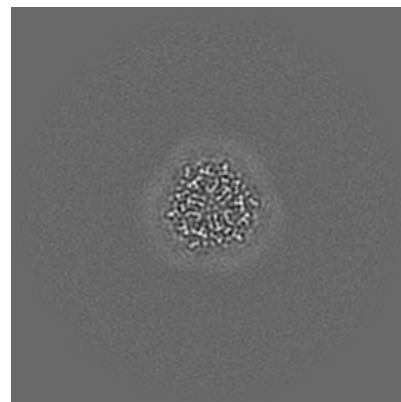
X Index: 128	Y Index: 128	Z Index: 128

6.2.2 Raw map
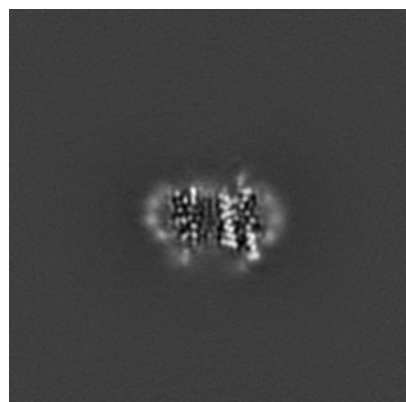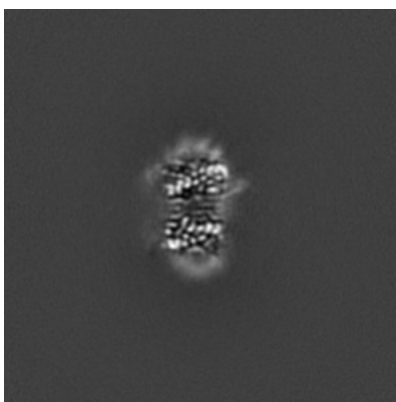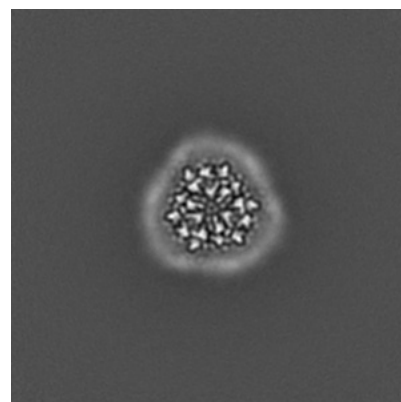
X Index: 128	Y Index: 128	Z Index: 128

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map
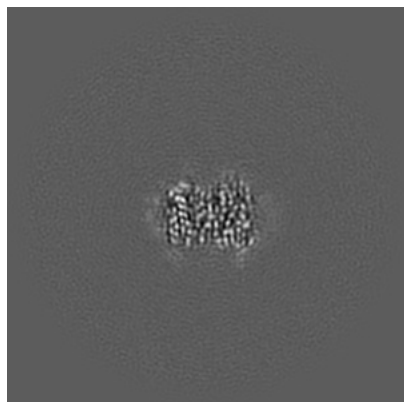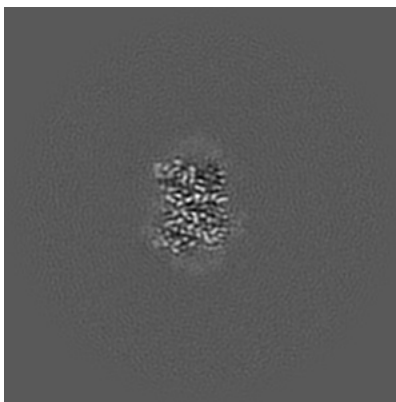
| X Index: 121 | Y Index: 114 | Z Index: 120 |
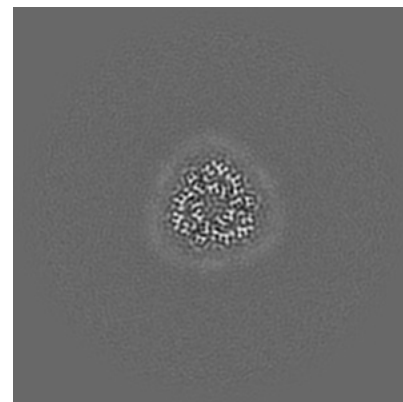
6.3.2 Raw map
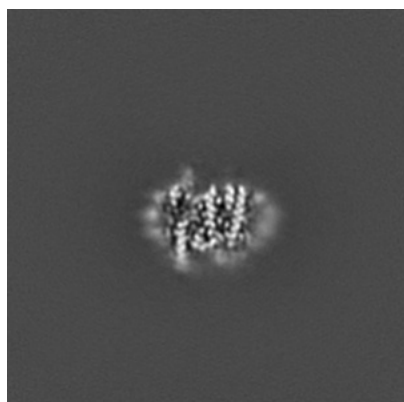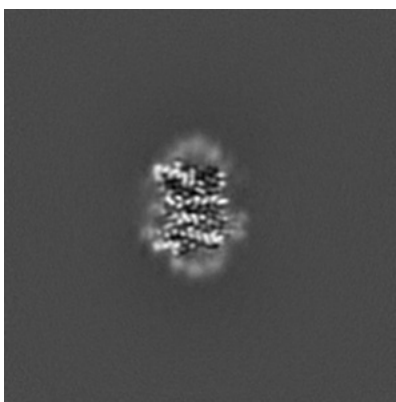
| X Index: 114 | Y Index: 114 | Z Index: 111 |
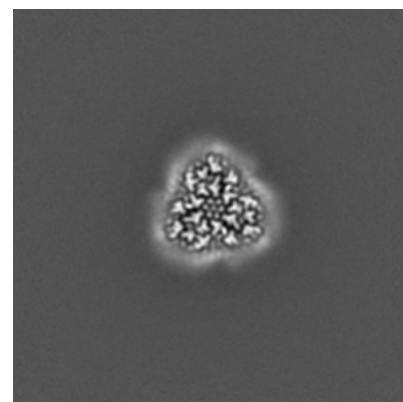
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map

X   Y   Z

6.4.2 Raw map

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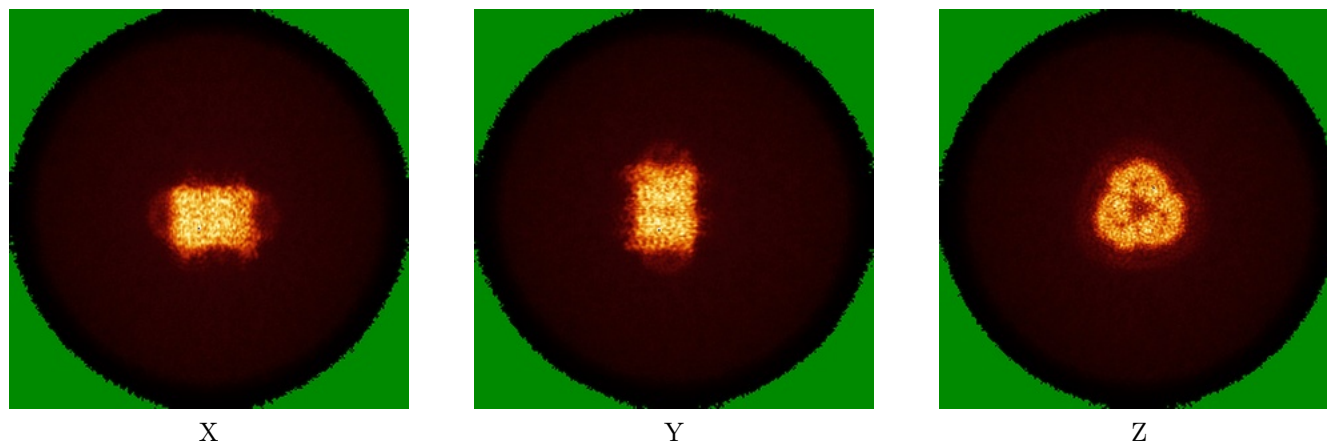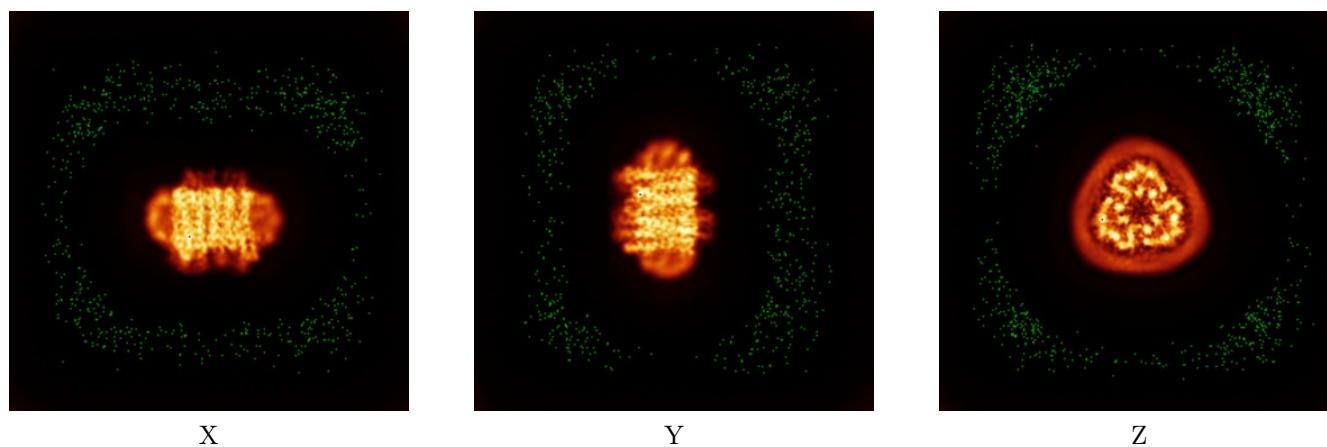
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X	Y	Z
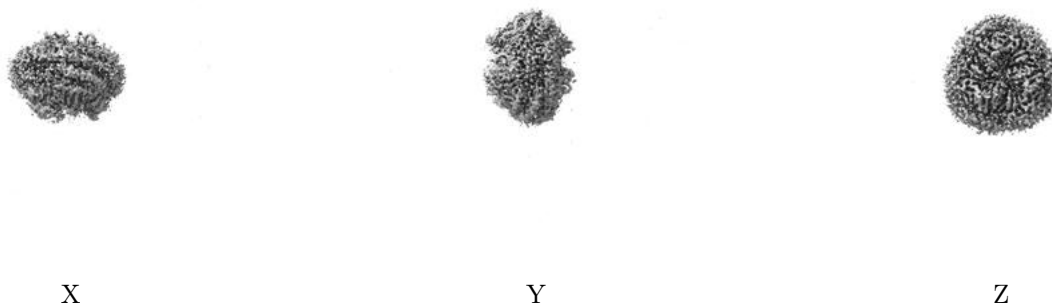
The images above show the 3D surface view of the map at the recommended contour level 0.6. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

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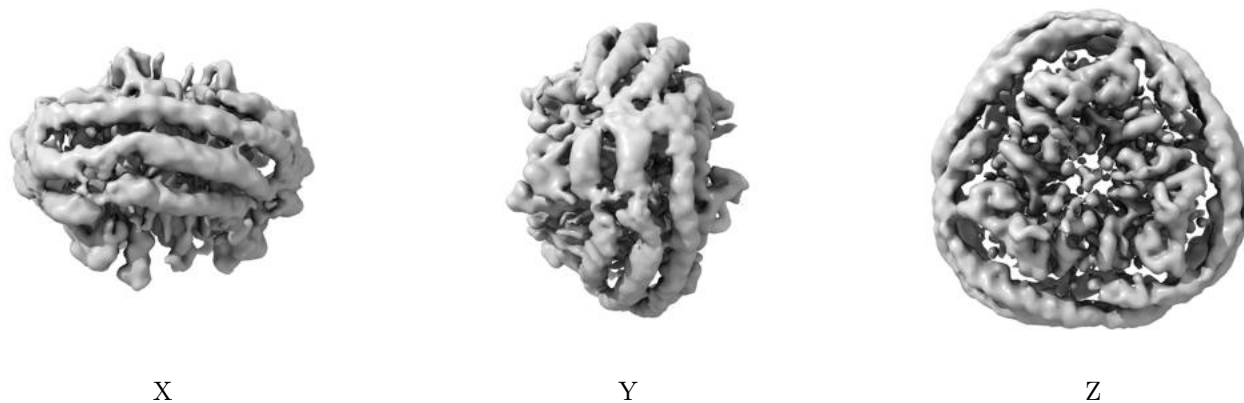
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation (i)

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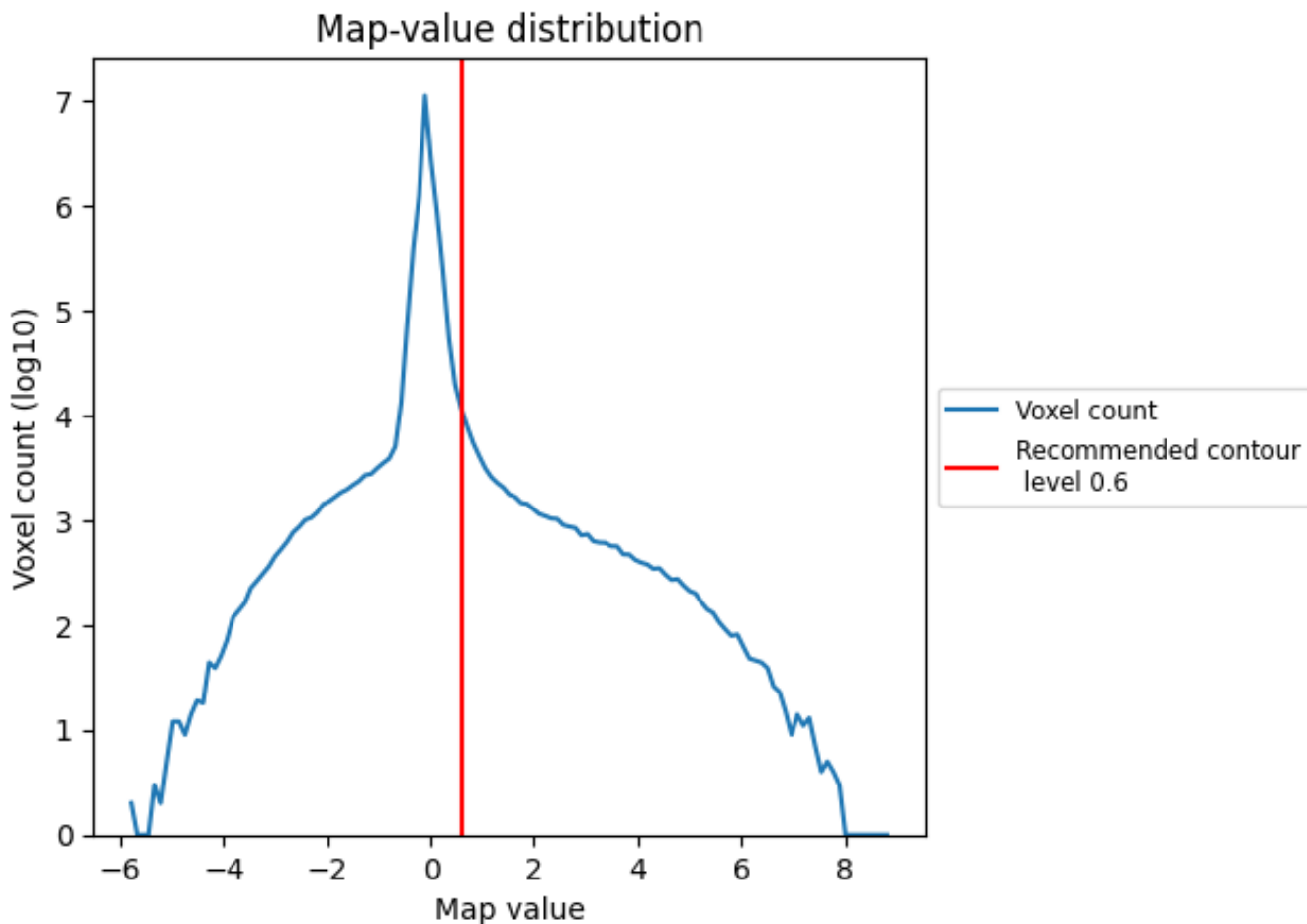
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate (i)
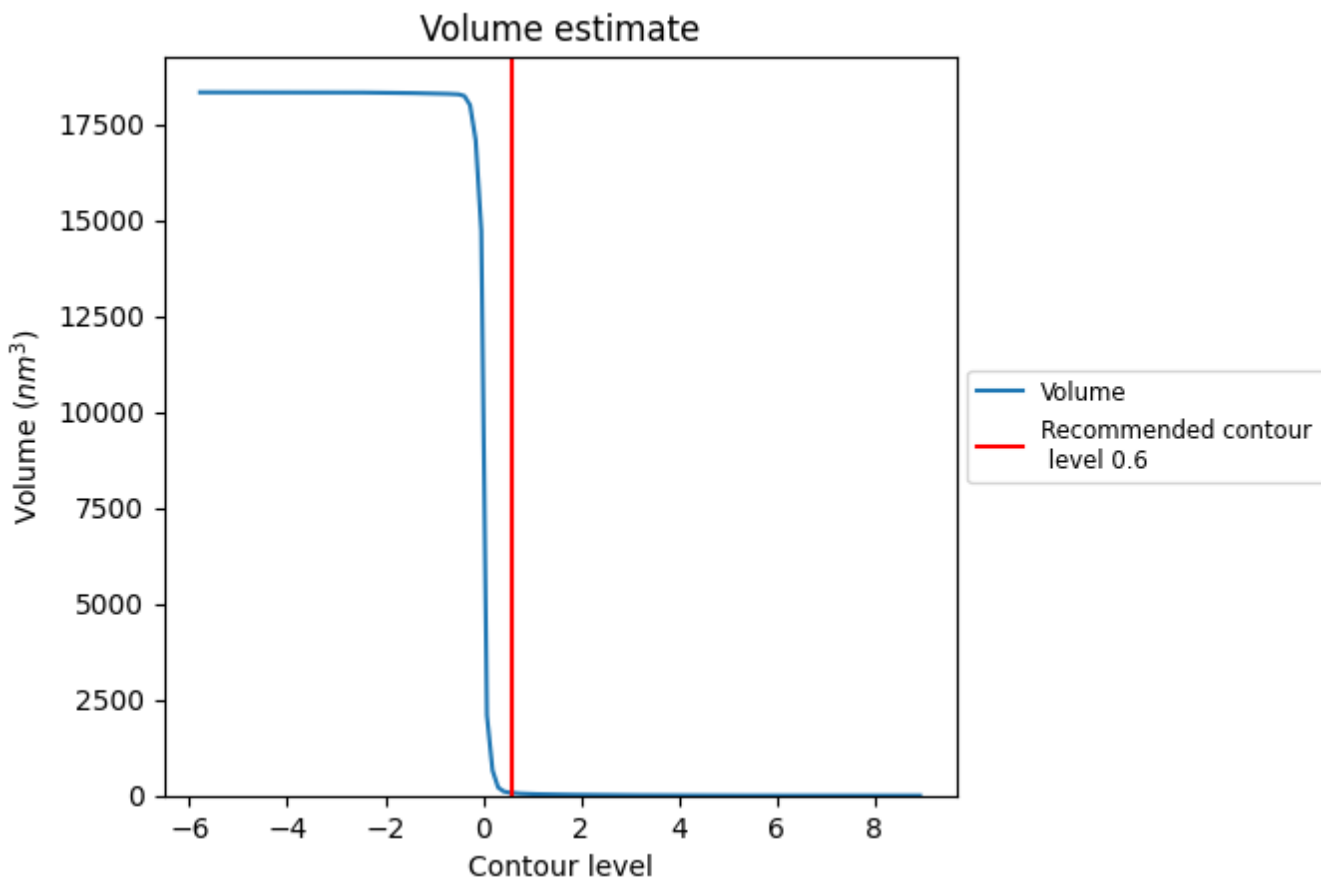
The volume at the recommended contour level is 69 nm^3; this corresponds to an approximate mass of 62 kDa.

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 ⓘ
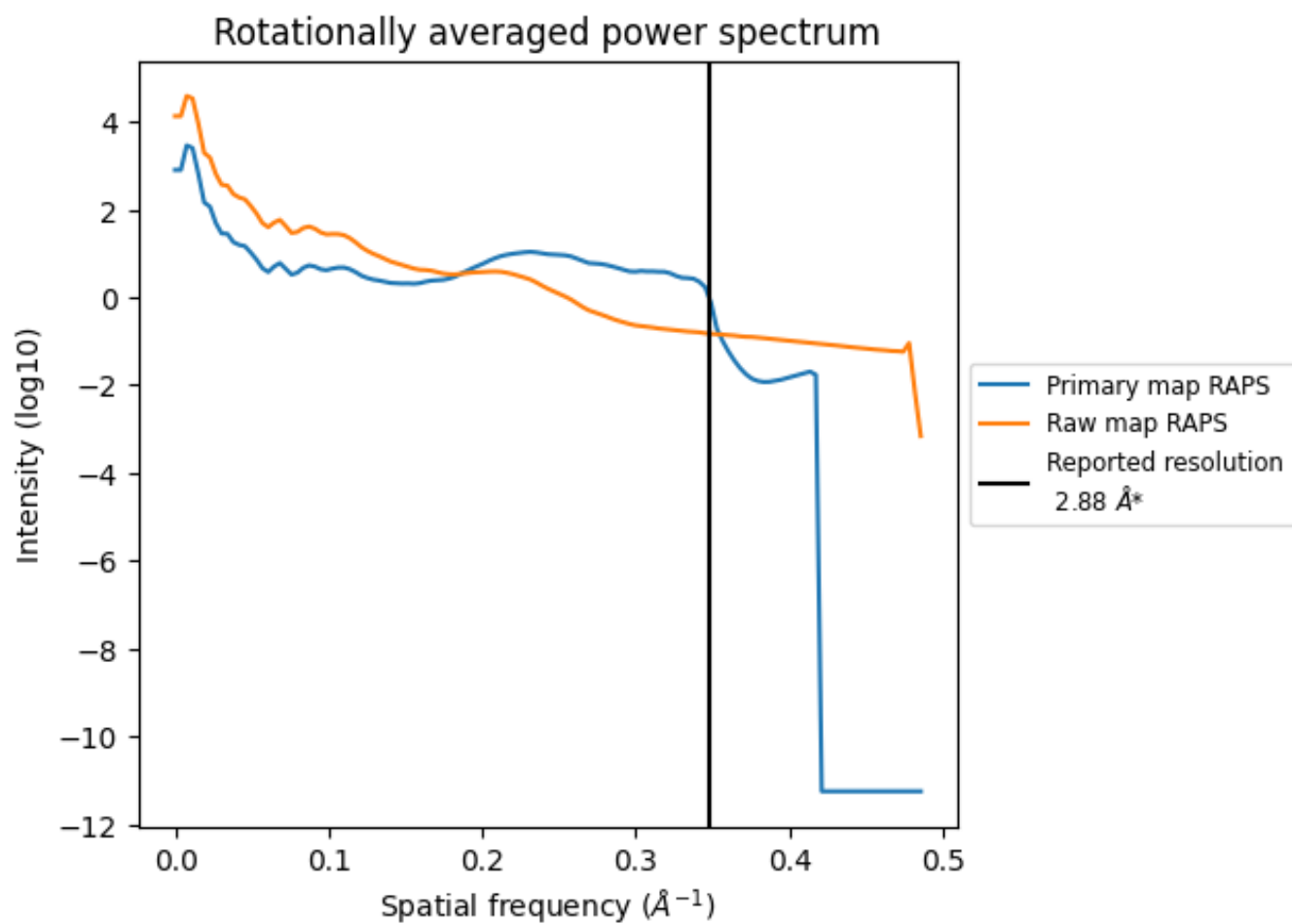
*Reported resolution corresponds to spatial frequency of 0.347 Å^{-1}

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 ⓘ
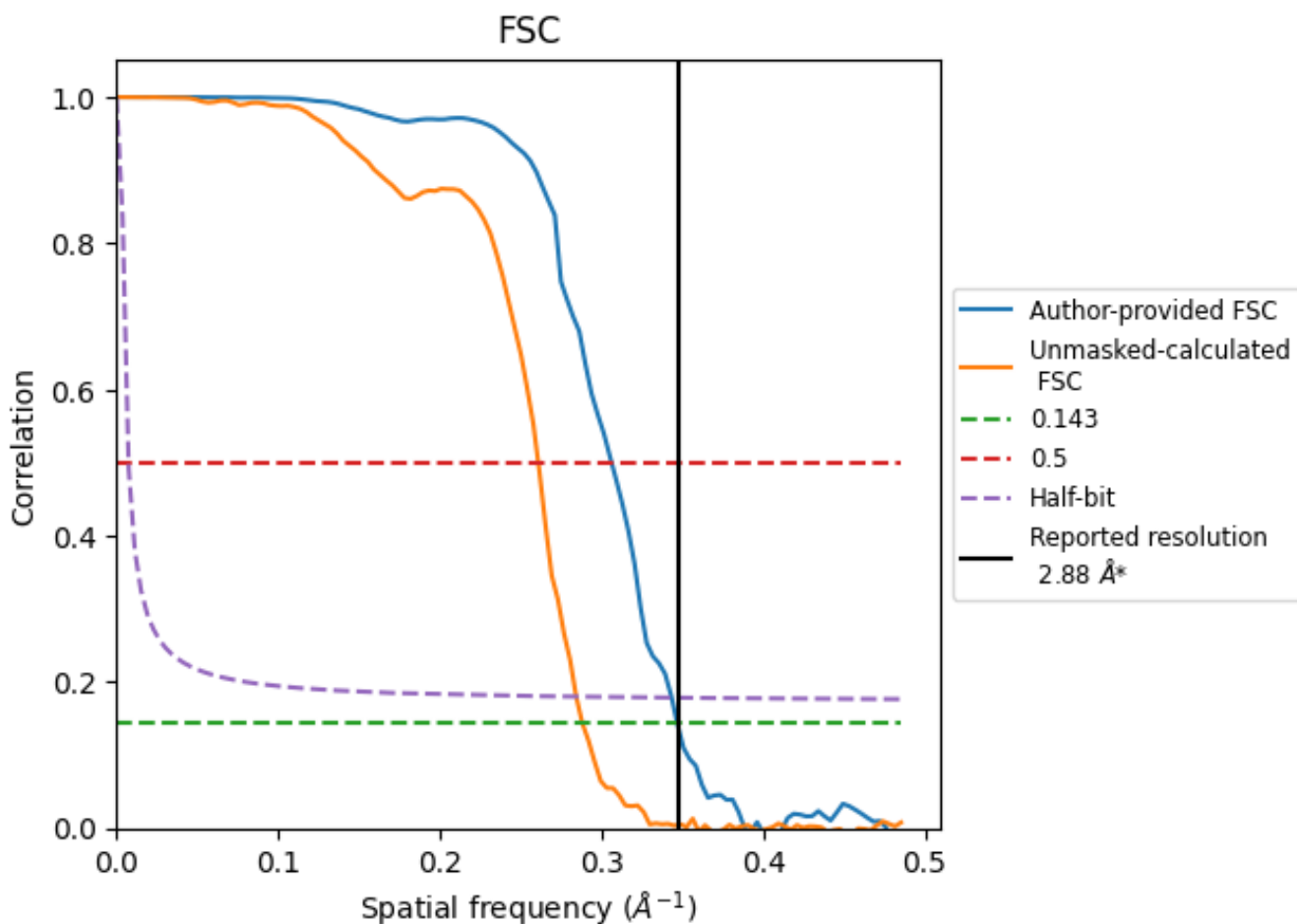
*Reported resolution corresponds to spatial frequency of 0.347 Å^{-1}

8.2 Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.88	-	-
Author-provided FSC curve	2.88	3.26	2.91
Unmasked-calculated*	3.47	3.83	3.51

*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 3.47 differs from the reported value 2.88 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-40062 and PDB model 8GI8. Per-residue inclusion information can be found in section 3 on page 6.

9.1 Map-model overlays

9.1.1 Map-model overlay ⓘ

| X | Y | Z |
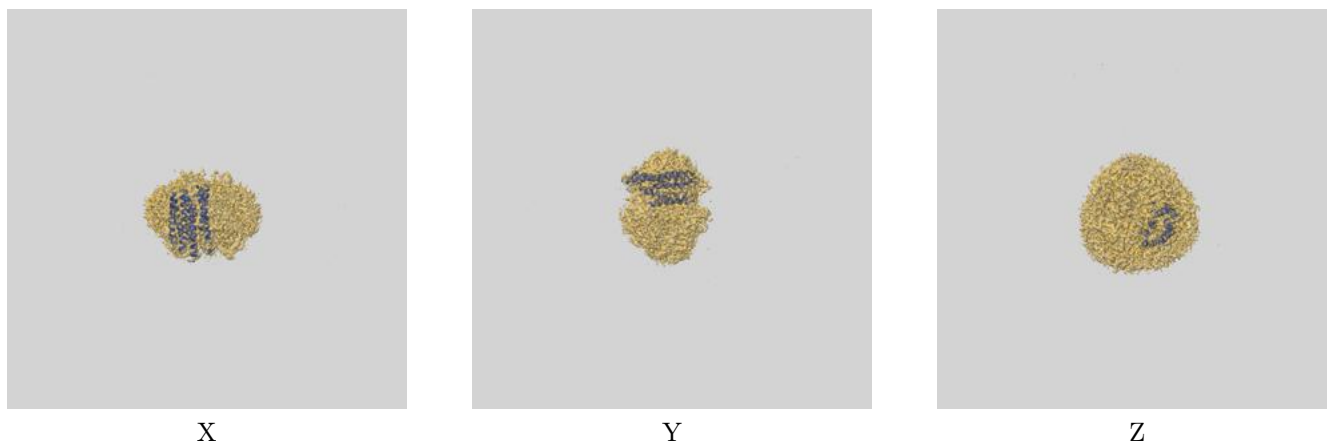
9.1.2 Map-model assembly overlay ⓘ

| X | Y | Z |
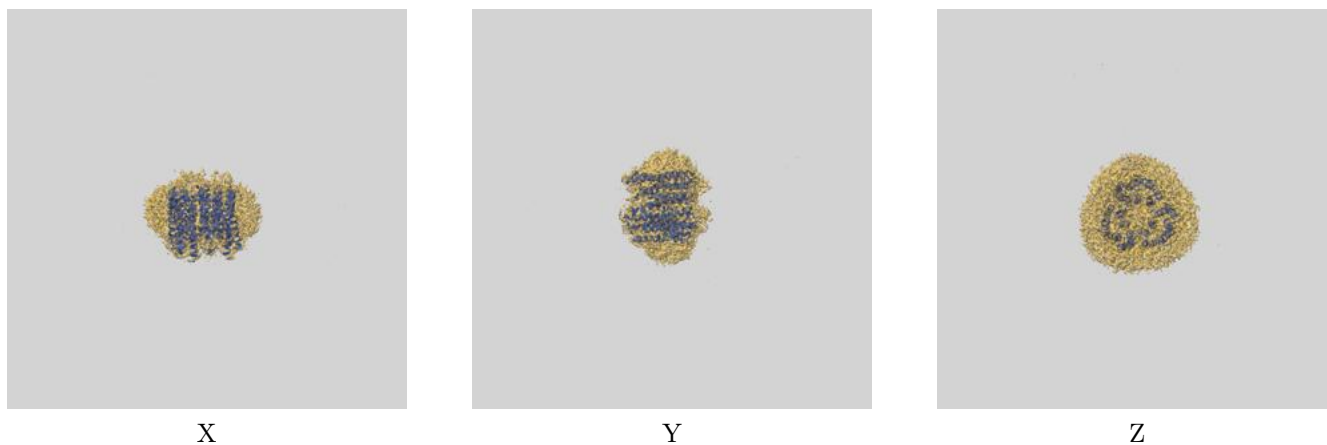
The images above show the 3D surface view of the map at the recommended contour level 0.6 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2   Q-score mapped to coordinate model   ⓘ

X   Y   Z
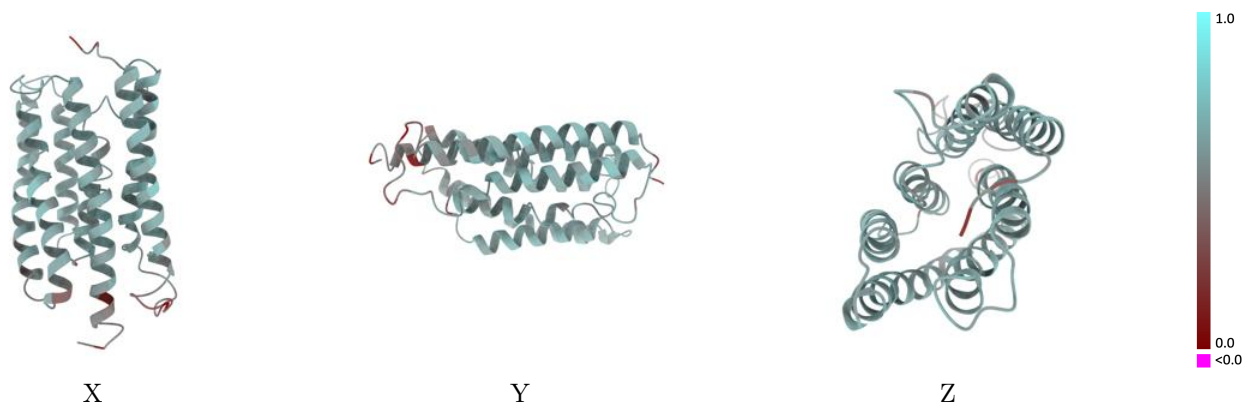
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
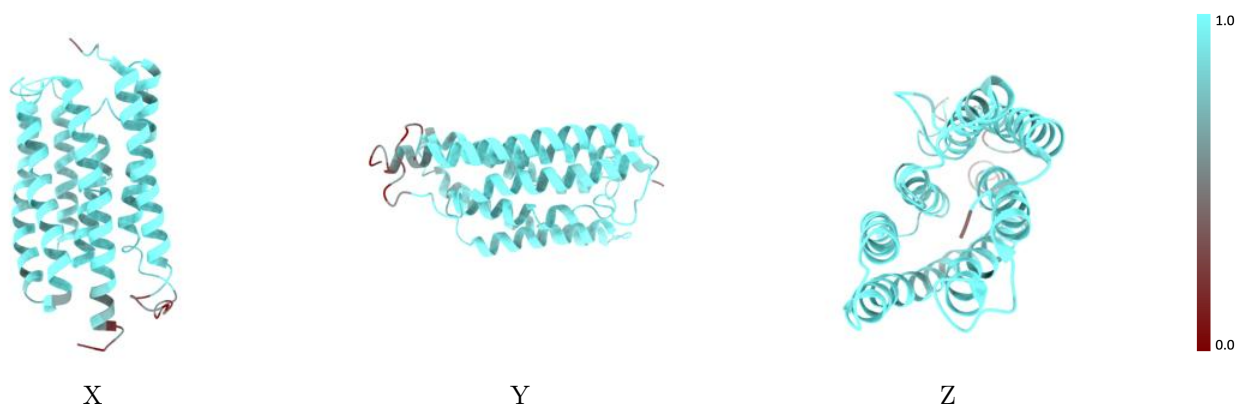
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.6).

9.4　Atom inclusion　ⓘ
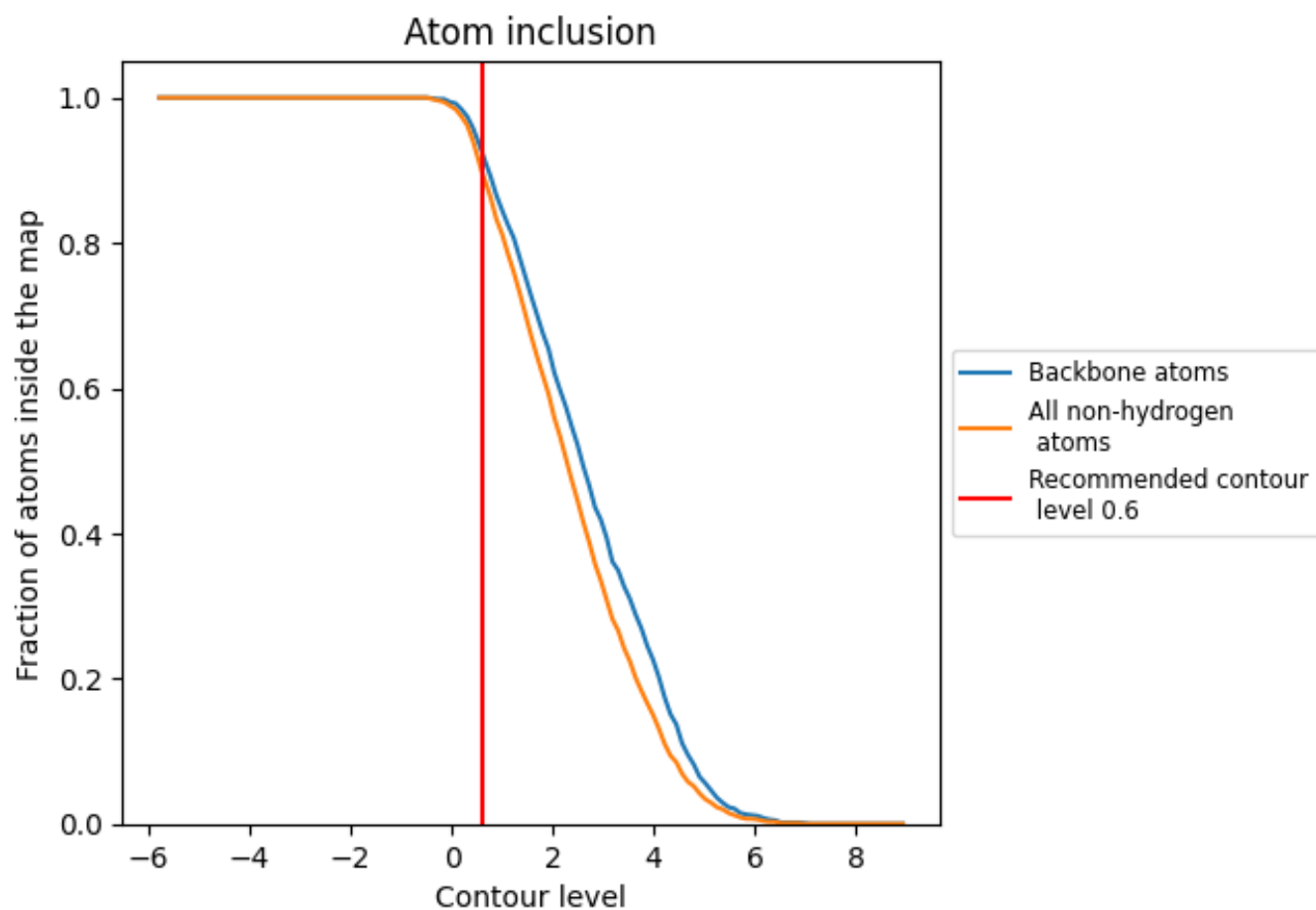
At the recommended contour level, 93% of all backbone atoms, 90% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.6) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8980	0.5580
A	0.8980	0.5580

1.0

0.0
<0.0