



Full wwPDB EM Validation Report ⓘ

Oct 13, 2024 – 05:17 pm BST

PDB ID : 8C8G
EMDB ID : EMD-16475
Title : Cryo-EM structure of BoNT/Wo-NTNH complex
Authors : Kosenina, S.; Skerlova, J.; Stenmark, P.
Deposited on : 2023-01-20
Resolution : 2.98 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.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

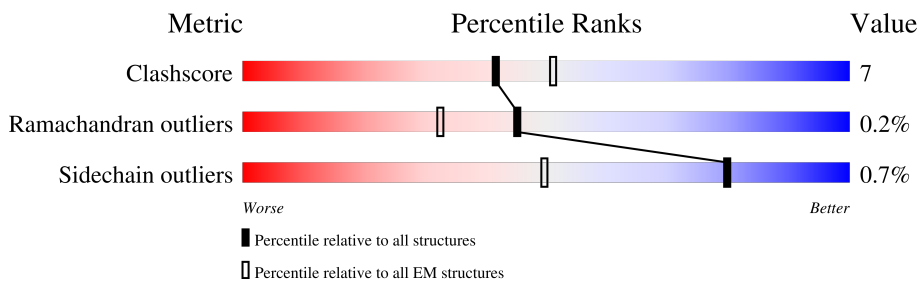
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.98 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	A	1371	
2	B	1458	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 20362 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 Putative botulinum-like toxin Wo.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1335	10790	6867	1786	2104	33	0	0

There are 35 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1337	GLY	-	expression tag	UNP A0A069CUU9
A	1338	SER	-	expression tag	UNP A0A069CUU9
A	1339	TYR	-	expression tag	UNP A0A069CUU9
A	1340	PRO	-	expression tag	UNP A0A069CUU9
A	1341	TYR	-	expression tag	UNP A0A069CUU9
A	1342	ASP	-	expression tag	UNP A0A069CUU9
A	1343	VAL	-	expression tag	UNP A0A069CUU9
A	1344	PRO	-	expression tag	UNP A0A069CUU9
A	1345	ASP	-	expression tag	UNP A0A069CUU9
A	1346	TYR	-	expression tag	UNP A0A069CUU9
A	1347	ALA	-	expression tag	UNP A0A069CUU9
A	1348	LEU	-	expression tag	UNP A0A069CUU9
A	1349	GLU	-	expression tag	UNP A0A069CUU9
A	1350	SER	-	expression tag	UNP A0A069CUU9
A	1351	GLY	-	expression tag	UNP A0A069CUU9
A	1352	LYS	-	expression tag	UNP A0A069CUU9
A	1353	GLU	-	expression tag	UNP A0A069CUU9
A	1354	THR	-	expression tag	UNP A0A069CUU9
A	1355	ALA	-	expression tag	UNP A0A069CUU9
A	1356	ALA	-	expression tag	UNP A0A069CUU9
A	1357	ALA	-	expression tag	UNP A0A069CUU9
A	1358	LYS	-	expression tag	UNP A0A069CUU9
A	1359	PHE	-	expression tag	UNP A0A069CUU9
A	1360	GLU	-	expression tag	UNP A0A069CUU9
A	1361	ARG	-	expression tag	UNP A0A069CUU9
A	1362	GLN	-	expression tag	UNP A0A069CUU9
A	1363	HIS	-	expression tag	UNP A0A069CUU9
A	1364	MET	-	expression tag	UNP A0A069CUU9

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	1365	ASP	-	expression tag	UNP A0A069CUU9
A	1366	SER	-	expression tag	UNP A0A069CUU9
A	1367	SER	-	expression tag	UNP A0A069CUU9
A	1368	THR	-	expression tag	UNP A0A069CUU9
A	1369	SER	-	expression tag	UNP A0A069CUU9
A	1370	ALA	-	expression tag	UNP A0A069CUU9
A	1371	ALA	-	expression tag	UNP A0A069CUU9

- Molecule 2 is a protein called Structural protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	1195	9572	6128	1517	1909	18	0	0

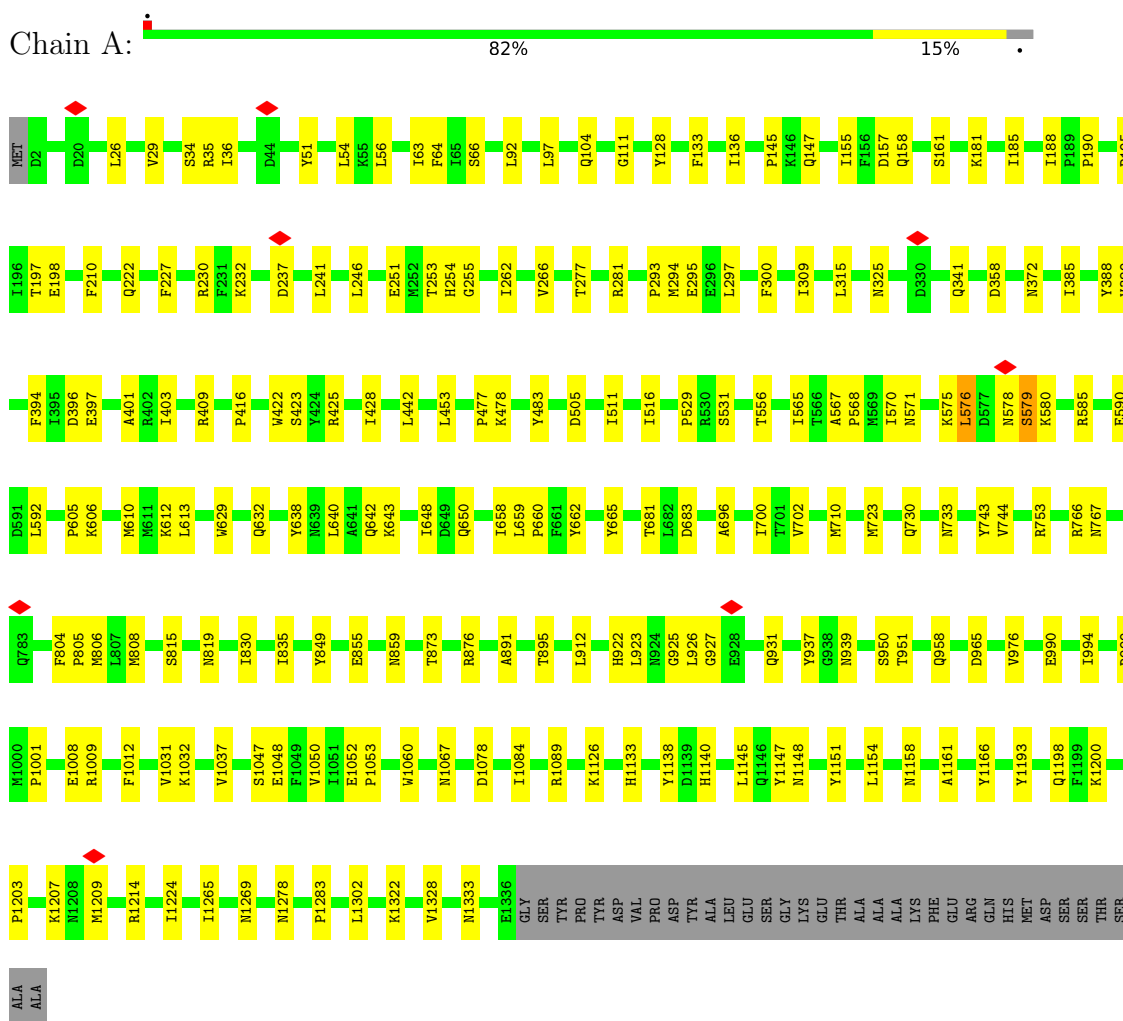
There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-12	MET	-	initiating methionine	UNP A0A069CVS9
B	-11	GLY	-	expression tag	UNP A0A069CVS9
B	-10	SER	-	expression tag	UNP A0A069CVS9
B	-9	ASP	-	expression tag	UNP A0A069CVS9
B	-8	TYR	-	expression tag	UNP A0A069CVS9
B	-7	LYS	-	expression tag	UNP A0A069CVS9
B	-6	ASP	-	expression tag	UNP A0A069CVS9
B	-5	ASP	-	expression tag	UNP A0A069CVS9
B	-4	ASP	-	expression tag	UNP A0A069CVS9
B	-3	ASP	-	expression tag	UNP A0A069CVS9
B	-2	LYS	-	expression tag	UNP A0A069CVS9
B	-1	SER	-	expression tag	UNP A0A069CVS9
B	0	GLY	-	expression tag	UNP A0A069CVS9
B	1438	SER	-	expression tag	UNP A0A069CVS9
B	1439	GLY	-	expression tag	UNP A0A069CVS9
B	1440	HIS	-	expression tag	UNP A0A069CVS9
B	1441	HIS	-	expression tag	UNP A0A069CVS9
B	1442	HIS	-	expression tag	UNP A0A069CVS9
B	1443	HIS	-	expression tag	UNP A0A069CVS9
B	1444	HIS	-	expression tag	UNP A0A069CVS9
B	1445	HIS	-	expression tag	UNP A0A069CVS9

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: Putative botulinum-like toxin Wo



- Molecule 2: Structural protein



MET	V129	P301	SE47	T718	Y890	T1129	T1198	GLN	TYR	SER
GLY	V130	A302	D548	D719	I896	Q1130	V1199	ASN	PHE	GLY
ASP	A131	N303	T549	D720	L897	D1131	ILE	PRO	THR	HIS
TRP	L135	D304	L550	S721	L897	S1132	ASN	LYS	LYS	HIS
LYS	L135	K305	P557	L722	D898	S1132	ASP	ASN	ARG	HIS
ASP	G139	Y306	E558	L729	D899	T1133	ILE	PHE	LYS	HIS
ASP	N143	P316	D559	L730	S915	L1134	TRP	HIS	ASP	HIS
ASP	S144	V332	I560	S731	T916	Q1135	TYR	PHE	THR	HIS
LYS	N145	V332	L561	E737	D917	N1136	ASP	ASP	ALA	ASP
SER	R146	I334	Q562	F737	V918	G1137	SER	LYS	ARG	LYS
GLY	L147	T355	L563	F740	E919	K1138	ILE	ILE	HIS	GLN
MET	D154	V571	L563	Q570	L928	E1139	ASN	ALA	ASP	PRO
ASN	I158	V377	Y572	W571	E929	W1140	ALA	PHE	PHE	ILE
LYS	L164	N385	A573	Y572	I936	V1141	CYS	ASP	LYS	ALA
L5	I166	V386	K574	A573	S937	R1142	LYS	VAL	GLY	VAL
G18	W166	V386	K574	D765	V938	A1143	THR	VAL	VAL	VAL
R40	W166	S392	T577	D765	D939	D1144	TYR	VAL	VAL	VAL
Y41	W166	E393	R578	F767	R945	L1146	GLY	VAL	VAL	VAL
Y41	N174	E394	I579	F779	K977	L1146	GLU	VAL	VAL	VAL
E44	R179	I395	L580	E780	V981	V1147	LEU	VAL	VAL	VAL
Q47	V188	V402	R581	I781	E1148	E1148	ALA	VAL	VAL	VAL
D50	R197	E406	L582	T782	I1149	I1150	ASN	VAL	VAL	VAL
E51	R197	F414	E583	K790	K992	I1150	ASN	TYR	TYR	TYR
V52	L201	I437	Q888	Y791	N996	D1153	VAL	ASN	GLY	VAL
T53	G202	F438	I594	S792	S1005	G1154	LYS	GLY	PRO	ALA
N54	L203	P439	L600	I793	I1008	M1155	GLY	VAL	ALA	ALA
P55	Q212	L447	L617	L796	I1008	K1156	ILE	LYS	ASP	GLY
E56	E224	L447	D618	I806	A1015	V1157	THR	ARG	LEU	ASP
Q57	F232	I450	Q825	I813	S1020	D1158	GLN	VAL	LEU	ASP
F58	S233	L456	Y626	I839	M1035	Y1159	ASN	LYS	LEU	ASN
L66	A234	L480	T632	K890	I1040	S1160	LEU	LYS	GLY	ASN
A67	N235	K496	I648	L841	Q1041	D1161	GLU	ALA	ALA	ASN
D68	V236	L500	V647	E847	S1047	D1162	THR	THR	THR	ASN
E71	L239	L500	I648	K851	T1071	Q1166	GLY	ASP	THR	ASN
L93	Q240	T507	I648	K851	Y1074	E1167	LYS	GLN	ASP	ASN
L95	Y242	N512	T654	V855	S1100	G1168	LEU	ILE	ILE	ILE
G101	N269	Q524	S655	V855	K1115	D1169	TYR	LYS	LYS	LYS
A102	Y272	D630	S656	E861	L1122	V1170	GLY	VAL	VAL	VAL
L105	L278	N533	E865	I876	K1115	D1171	VAL	VAL	VAL	VAL
M113	K279	F544	D865	K880	L1122	I1172	VAL	VAL	VAL	VAL
T114	L287	N545	I876	I884	L1122	N1173	TYR	VAL	VAL	VAL
D120	V299	I546	I885	V886	S1125	K1174	ASN	VAL	VAL	VAL
K124	I300	I546	G887	V886	S1126	A1175	ASN	ASP	ASP	ASP
			I709	G887	I1127	G1177	PRO	LYS	LYS	LYS
			K710	I709	K1128	V1177	ASP	ASP	ASP	ASP
				K710	K1128	Y1178	VAL	VAL	VAL	VAL
						D1179	ILE	ILE	ILE	ILE
						I1180	ASN	ASN	ASN	ASN
						F1182				
						R1185				
						I1190				
						S1194				
						F1196				
						K1196				
						V1197				

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	283452	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 ($e^-/\text{\AA}^2$)	40	Depositor
Minimum defocus (nm)	1600	Depositor
Maximum defocus (nm)	3200	Depositor
Magnification	165000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	1.246	Depositor
Minimum map value	-0.856	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.040	Depositor
Recommended contour level	0.124	Depositor
Map size (Å)	262.4, 262.4, 262.4	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.82, 0.82, 0.82	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	A	0.65	0/11018	0.74	0/14897
2	B	0.64	0/9759	0.72	1/13242 (0.0%)
All	All	0.65	0/20777	0.73	1/28139 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	241	PRO	N-CA-CB	-8.62	92.95	103.30

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	10790	0	10543	143	0
2	B	9572	0	9465	142	0
All	All	20362	0	20008	266	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 7.

All (266) 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:B:1129:THR:CG2	2:B:1146:LEU:HD23	1.65	1.23
2:B:1129:THR:HG22	2:B:1146:LEU:HD23	1.28	1.06
2:B:560:ILE:HG23	2:B:563:LEU:HD21	1.49	0.93
2:B:1129:THR:CG2	2:B:1146:LEU:CD2	2.53	0.86
2:B:239:LEU:O	2:B:240:GLN:C	2.20	0.80
2:B:93:LEU:HD12	2:B:93:LEU:C	2.03	0.79
1:A:1302:LEU:CB	2:B:93:LEU:HD11	2.13	0.77
2:B:1134:LEU:HB3	2:B:1138:LYS:HB3	1.68	0.75
2:B:1146:LEU:HD11	2:B:1182:PHE:CG	2.23	0.74
1:A:766:ARG:CG	1:A:808:MET:HE1	2.21	0.70
2:B:1129:THR:HG23	2:B:1146:LEU:HD23	1.67	0.70
1:A:1302:LEU:HD11	2:B:392:SER:HB2	1.75	0.69
1:A:766:ARG:HB2	1:A:808:MET:HE1	1.76	0.68
1:A:1302:LEU:HB3	2:B:93:LEU:HD11	1.74	0.67
2:B:740:PHE:HB2	2:B:839:ILE:HD11	1.75	0.67
1:A:1302:LEU:HB2	2:B:93:LEU:HD11	1.74	0.67
1:A:29:VAL:O	1:A:181:LYS:NZ	2.29	0.66
1:A:516:ILE:HD13	2:B:981:VAL:HG21	1.77	0.66
1:A:36:ILE:HG12	1:A:54:LEU:HD21	1.78	0.65
1:A:659:LEU:HD11	1:A:815:SER:HA	1.78	0.65
1:A:612:LYS:O	1:A:629:TRP:NE1	2.30	0.65
2:B:105:LEU:HB2	2:B:158:ILE:HG23	1.79	0.65
1:A:743:TYR:HH	1:A:895:THR:HG1	1.44	0.65
1:A:766:ARG:CB	1:A:808:MET:HE1	2.27	0.65
2:B:496:LYS:HG3	2:B:500:LEU:HD12	1.78	0.64
2:B:299:VAL:HG12	2:B:300:ILE:HD12	1.80	0.64
2:B:438:PHE:HB3	2:B:439:PRO:HD3	1.81	0.63
2:B:570:GLN:HG3	2:B:574:LYS:HD2	1.81	0.63
1:A:659:LEU:HD11	1:A:815:SER:CA	2.27	0.63
1:A:766:ARG:HB2	1:A:808:MET:CE	2.29	0.63
1:A:648:ILE:HG22	1:A:650:GLN:H	1.64	0.62
1:A:766:ARG:HG3	1:A:808:MET:HE1	1.82	0.61
1:A:1140:HIS:O	1:A:1269:ASN:ND2	2.34	0.61
1:A:958:GLN:HE22	2:B:996:ASN:HD21	1.47	0.61
1:A:638:TYR:O	1:A:642:GLN:NE2	2.34	0.61
1:A:640:LEU:HA	1:A:660:PRO:HB2	1.83	0.60
2:B:233:SER:OG	2:B:234:ALA:N	2.34	0.60
1:A:1148:ASN:HA	1:A:1200:LYS:HE3	1.84	0.60
1:A:36:ILE:HG12	1:A:54:LEU:CD2	2.32	0.59
2:B:301:PRO:HG2	2:B:625:GLN:HB3	1.84	0.59
2:B:977:LYS:HD3	2:B:992:LYS:HD3	1.85	0.59
2:B:93:LEU:C	2:B:93:LEU:CD1	2.71	0.58

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:54:LEU:HD12	1:A:66:SER:HB2	1.84	0.58
2:B:594:ILE:HG23	2:B:617:LEU:HD22	1.85	0.58
1:A:1214:ARG:NH2	2:B:939:ASP:OD2	2.36	0.58
2:B:1135:GLN:H	2:B:1138:LYS:HB2	1.69	0.57
2:B:58:PHE:O	2:B:143:ASN:ND2	2.34	0.57
1:A:111:GLY:HA3	1:A:428:ILE:HD11	1.86	0.56
1:A:585:ARG:NH2	1:A:613:LEU:O	2.38	0.56
1:A:1052:GLU:N	1:A:1053:PRO:HD2	2.20	0.56
1:A:66:SER:HB3	1:A:188:ILE:HG22	1.88	0.56
1:A:990:GLU:O	1:A:1089:ARG:NH1	2.35	0.56
2:B:765:VAL:HG22	2:B:841:LEU:HD12	1.87	0.56
1:A:232:LYS:HD2	1:A:237:ASP:HA	1.87	0.56
2:B:524:GLN:HE21	2:B:530:ASP:HB3	1.71	0.56
1:A:925:GLY:HA3	1:A:951:THR:HG21	1.88	0.56
2:B:896:ILE:HD11	2:B:1035:ASN:HA	1.88	0.55
2:B:95:LEU:HD22	2:B:188:VAL:HG23	1.88	0.55
1:A:1145:LEU:HD22	1:A:1151:TYR:CE2	2.41	0.55
1:A:54:LEU:HD12	1:A:66:SER:CB	2.37	0.55
1:A:1148:ASN:HB2	1:A:1209:MET:HA	1.89	0.55
1:A:702:VAL:HG11	1:A:835:ILE:HD11	1.88	0.55
2:B:102:ALA:HA	2:B:279:LYS:HG3	1.89	0.54
2:B:135:LEU:HD21	2:B:166:TRP:HE3	1.72	0.54
1:A:262:ILE:HG21	1:A:389:VAL:HG13	1.89	0.54
1:A:253:THR:HG21	1:A:396:ASP:HA	1.89	0.54
2:B:718:THR:HG22	2:B:720:ASP:H	1.71	0.54
2:B:559:ASP:OD1	2:B:559:ASP:N	2.40	0.54
1:A:1278:ASN:HA	1:A:1283:PRO:HA	1.90	0.54
2:B:239:LEU:O	2:B:241:PRO:N	2.41	0.54
2:B:557:PRO:HD2	2:B:563:LEU:HD23	1.89	0.54
1:A:958:GLN:HE22	2:B:996:ASN:ND2	2.05	0.54
2:B:145:ASN:HD22	2:B:166:TRP:HA	1.73	0.54
2:B:240:GLN:HG2	2:B:564:LYS:HD3	1.91	0.53
1:A:632:GLN:HE21	2:B:533:ASN:HB3	1.74	0.53
2:B:240:GLN:O	2:B:241:PRO:C	2.47	0.53
1:A:643:LYS:HA	1:A:659:LEU:HD23	1.90	0.52
2:B:239:LEU:HD22	2:B:377:VAL:HB	1.92	0.52
1:A:396:ASP:OD1	1:A:396:ASP:N	2.43	0.52
1:A:195:PRO:HG2	1:A:198:GLU:HB2	1.91	0.52
1:A:590:GLU:HB3	1:A:606:LYS:HG2	1.93	0.51
2:B:212:GLN:HE22	2:B:548:ASP:HB2	1.75	0.51
1:A:965:ASP:O	1:A:1009:ARG:NH1	2.42	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1032:LYS:NZ	1:A:1048:GLU:OE2	2.44	0.51
2:B:301:PRO:CG	2:B:625:GLN:HB3	2.40	0.51
2:B:550:LEU:HD22	2:B:570:GLN:HG2	1.92	0.51
2:B:1128:LYS:HB2	2:B:1148:GLU:HB3	1.93	0.51
1:A:926:LEU:HB3	2:B:1015:ALA:HB1	1.93	0.51
1:A:230:ARG:HG2	1:A:422:TRP:HA	1.93	0.51
2:B:1146:LEU:HD11	2:B:1182:PHE:CB	2.41	0.51
1:A:63:ILE:HG23	1:A:185:ILE:HB	1.93	0.50
1:A:325:ASN:O	1:A:341:GLN:NE2	2.44	0.50
1:A:294:MET:HG2	1:A:297:LEU:HD12	1.93	0.50
2:B:179:ARG:NH2	2:B:618:ASP:OD2	2.45	0.50
1:A:56:LEU:HD22	1:A:64:PHE:HB3	1.94	0.50
1:A:111:GLY:CA	1:A:428:ILE:HD11	2.42	0.50
2:B:880:LYS:NZ	2:B:1074:TYR:O	2.45	0.50
1:A:1265:ILE:HG21	1:A:1322:LYS:HD3	1.92	0.50
1:A:1158:ASN:ND2	2:B:385:ASN:O	2.44	0.49
2:B:57:GLN:NE2	2:B:334:ILE:O	2.44	0.49
1:A:155:ILE:HD11	1:A:529:PRO:HG2	1.94	0.49
2:B:1185:ARG:HA	2:B:1190:ILE:HG12	1.93	0.49
1:A:1207:LYS:NZ	2:B:937:SER:OG	2.41	0.49
1:A:516:ILE:CD1	2:B:981:VAL:HG21	2.42	0.49
1:A:1302:LEU:CD1	2:B:392:SER:HB2	2.43	0.49
1:A:638:TYR:CZ	2:B:507:THR:HG21	2.48	0.49
2:B:101:GLY:HA3	2:B:395:ILE:HD12	1.94	0.49
1:A:181:LYS:HA	1:A:531:SER:HA	1.95	0.49
2:B:447:LEU:HD21	2:B:480:LEU:HB3	1.94	0.49
2:B:174:ASN:ND2	2:B:299:VAL:O	2.46	0.49
2:B:583:GLU:HB2	2:B:632:THR:HG21	1.96	0.48
2:B:1041:GLN:HB3	2:B:1074:TYR:HB3	1.95	0.48
2:B:269:ASN:HB2	2:B:272:TYR:H	1.78	0.48
2:B:1005:SER:HB2	2:B:1008:ILE:HB	1.95	0.48
1:A:133:PHE:HA	1:A:136:ILE:HG22	1.94	0.48
2:B:839:ILE:HD13	2:B:855:VAL:HG11	1.95	0.48
1:A:385:ILE:HA	1:A:388:TYR:HB3	1.95	0.48
2:B:93:LEU:HD12	2:B:94:GLU:N	2.28	0.48
2:B:1047:SER:HB3	2:B:1071:THR:HB	1.94	0.48
1:A:92:LEU:H	1:A:104:GLN:NE2	2.12	0.48
2:B:68:ASP:HB3	2:B:71:GLU:HG2	1.94	0.48
1:A:570:ILE:HD13	1:A:665:TYR:HA	1.96	0.48
2:B:884:ILE:HG21	2:B:928:LEU:HD12	1.96	0.48
1:A:277:THR:HA	1:A:293:PRO:HA	1.94	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1198:GLN:HB3	1:A:1224:ILE:HD12	1.96	0.47
2:B:241:PRO:O	2:B:242:TYR:C	2.52	0.47
1:A:927:GLY:HA3	1:A:931:GLN:HA	1.96	0.47
2:B:232:PHE:HZ	2:B:236:VAL:HG23	1.79	0.47
2:B:707:ASP:OD1	2:B:707:ASP:N	2.47	0.47
1:A:128:TYR:OH	1:A:394:PHE:O	2.31	0.47
1:A:662:TYR:OH	1:A:819:ASN:ND2	2.47	0.47
1:A:567:ALA:HB3	1:A:568:PRO:HD3	1.95	0.47
2:B:779:PHE:O	2:B:791:TYR:N	2.47	0.47
1:A:251:GLU:O	1:A:255:GLY:N	2.48	0.47
1:A:958:GLN:NE2	2:B:996:ASN:HD21	2.12	0.47
1:A:51:TYR:OH	1:A:158:GLN:NE2	2.47	0.47
1:A:145:PRO:O	1:A:147:GLN:NE2	2.44	0.47
1:A:681:THR:HG23	1:A:683:ASP:H	1.80	0.47
2:B:58:PHE:CE1	2:B:316:PRO:HB3	2.49	0.47
2:B:560:ILE:HG21	2:B:654:THR:HG21	1.97	0.47
2:B:665:ASP:OD1	2:B:665:ASP:N	2.41	0.47
2:B:793:ILE:HD12	2:B:796:LEU:HD13	1.97	0.47
2:B:688:GLN:HB2	2:B:855:VAL:HG23	1.97	0.47
2:B:129:VAL:HG12	2:B:402:VAL:HG12	1.97	0.47
2:B:718:THR:OG1	2:B:729:LEU:HB2	2.15	0.47
1:A:1154:LEU:HD23	1:A:1161:ALA:HB2	1.96	0.47
2:B:437:ILE:HG12	2:B:456:LEU:HD11	1.96	0.47
2:B:876:ILE:HD12	2:B:936:ILE:HG22	1.97	0.47
2:B:710:LYS:HE3	2:B:737:GLU:HB3	1.97	0.46
2:B:55:PRO:HB2	2:B:332:VAL:HG21	1.98	0.46
2:B:239:LEU:HG	2:B:242:TYR:CZ	2.50	0.46
2:B:240:GLN:H	2:B:240:GLN:NE2	2.13	0.46
2:B:886:VAL:HG13	2:B:929:GLU:HA	1.96	0.46
2:B:915:SER:OG	2:B:917:ASP:OD1	2.32	0.46
2:B:929:GLU:OE1	2:B:945:ARG:NH1	2.47	0.46
1:A:478:LYS:NZ	1:A:556:THR:OG1	2.47	0.46
1:A:1008:GLU:HA	1:A:1031:VAL:O	2.15	0.46
1:A:56:LEU:HD23	1:A:56:LEU:HA	1.77	0.46
2:B:40:ARG:HG3	2:B:66:LEU:HB2	1.97	0.46
2:B:120:ASP:OD1	2:B:124:LYS:N	2.49	0.46
1:A:999:ARG:HB2	1:A:1060:TRP:CD2	2.52	0.45
2:B:557:PRO:CD	2:B:563:LEU:HD23	2.46	0.45
2:B:767:PHE:HD2	2:B:806:ILE:HD13	1.81	0.45
2:B:780:GLU:OE2	2:B:790:LYS:NZ	2.50	0.45
1:A:34:SER:OG	1:A:35:ARG:N	2.47	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:128:TYR:HD2	1:A:403:ILE:HD11	1.80	0.45
1:A:950:SER:OG	1:A:951:THR:N	2.49	0.45
1:A:994:ILE:HD12	1:A:1012:PHE:HZ	1.81	0.45
2:B:114:THR:OG1	2:B:131:ALA:O	2.35	0.45
2:B:44:GLU:HB3	2:B:414:PHE:HE2	1.80	0.45
2:B:154:ASP:N	2:B:154:ASP:OD1	2.48	0.45
1:A:565:ILE:HG22	1:A:570:ILE:HG13	1.98	0.45
2:B:41:TYR:HB3	2:B:139:GLY:HA2	1.99	0.45
2:B:303:ASN:HA	2:B:306:TYR:CZ	2.52	0.45
1:A:1001:PRO:HB3	1:A:1333:ASN:HB3	1.98	0.45
1:A:1147:TYR:HB3	1:A:1203:PRO:HD3	1.99	0.45
2:B:241:PRO:HB2	2:B:562:GLN:HA	1.98	0.45
1:A:232:LYS:O	1:A:409:ARG:NH2	2.49	0.45
1:A:511:ILE:HG21	1:A:891:ALA:HB2	1.99	0.45
1:A:605:PRO:HD2	1:A:610:MET:HG3	1.98	0.45
1:A:246:LEU:HD21	1:A:401:ALA:HB2	1.98	0.44
1:A:804:PHE:O	1:A:805:PRO:C	2.55	0.44
2:B:143:ASN:OD1	2:B:143:ASN:N	2.51	0.44
1:A:190:PRO:HA	1:A:222:GLN:HB3	1.99	0.44
1:A:710:MET:HG3	1:A:849:TYR:HE2	1.82	0.44
2:B:201:LEU:HD11	2:B:287:LEU:HD13	1.98	0.44
1:A:197:THR:HG22	1:A:227:PHE:HB3	2.00	0.44
1:A:650:GLN:NE2	1:A:681:THR:OG1	2.51	0.44
1:A:1200:LYS:HG3	1:A:1224:ILE:HD11	1.98	0.44
2:B:647:VAL:HG13	2:B:648:ILE:HG23	2.00	0.44
1:A:210:PHE:HB3	1:A:266:VAL:HG11	2.00	0.44
1:A:157:ASP:N	1:A:157:ASP:OD1	2.51	0.44
1:A:251:GLU:HA	1:A:254:HIS:HB2	1.99	0.44
1:A:35:ARG:HB3	1:A:51:TYR:HD2	1.83	0.44
1:A:766:ARG:NE	1:A:808:MET:HE1	2.32	0.44
2:B:546:ILE:HG12	2:B:578:ARG:HB2	2.00	0.44
1:A:700:ILE:HD12	1:A:830:ILE:HG21	2.00	0.43
2:B:731:SER:HA	2:B:847:GLU:HG2	2.00	0.43
2:B:754:THR:HB	2:B:851:LYS:HB3	2.00	0.43
2:B:147:LEU:O	2:B:197:ARG:NH1	2.51	0.43
2:B:577:THR:HA	2:B:580:LEU:HB3	2.00	0.43
1:A:300:PHE:HD1	1:A:397:GLU:HB3	1.83	0.43
2:B:50:ASP:OD1	2:B:50:ASP:N	2.51	0.43
2:B:719:ASP:OD1	2:B:719:ASP:N	2.51	0.43
1:A:423:SER:HB3	1:A:453:LEU:HD12	1.99	0.43
1:A:1078:ASP:HB2	1:A:1126:LYS:HG2	2.01	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:239:LEU:O	2:B:242:TYR:N	2.52	0.43
2:B:688:GLN:HG3	2:B:740:PHE:HE1	1.84	0.43
1:A:505:ASP:O	1:A:733:ASN:ND2	2.44	0.43
2:B:233:SER:HB3	2:B:572:TYR:CE2	2.53	0.43
1:A:1067:ASN:OD1	1:A:1089:ARG:NH2	2.51	0.43
2:B:899:ASP:OD1	2:B:1041:GLN:NE2	2.45	0.43
1:A:576:LEU:HD11	1:A:578:ASN:ND2	2.33	0.43
2:B:203:LEU:HB2	2:B:224:GLU:HG3	2.00	0.43
1:A:1193:TYR:HB3	1:A:1328:VAL:HG21	2.00	0.43
2:B:751:VAL:HG22	2:B:855:VAL:HG12	2.00	0.43
2:B:781:ILE:HD11	2:B:813:ILE:HD11	2.00	0.43
2:B:105:LEU:O	2:B:113:ASN:ND2	2.48	0.42
2:B:438:PHE:CE2	2:B:588:GLN:HB3	2.54	0.42
2:B:239:LEU:HA	2:B:242:TYR:CE1	2.54	0.42
2:B:450:ILE:HG12	2:B:600:LEU:HD11	2.01	0.42
1:A:766:ARG:CB	1:A:808:MET:CE	2.94	0.42
1:A:912:LEU:HD22	1:A:939:ASN:HB3	2.01	0.42
1:A:453:LEU:HA	1:A:453:LEU:HD23	1.84	0.42
1:A:97:LEU:HD13	1:A:425:ARG:HD2	2.00	0.42
2:B:300:ILE:HG21	2:B:306:TYR:OH	2.20	0.42
2:B:305:LYS:HB3	2:B:580:LEU:HD21	2.01	0.42
2:B:544:PHE:HD2	2:B:579:ILE:HA	1.84	0.42
1:A:315:LEU:HD11	1:A:744:VAL:HG13	2.02	0.42
1:A:730:GLN:HA	1:A:733:ASN:HB2	2.00	0.42
2:B:53:THR:OG1	2:B:54:ASN:N	2.52	0.41
1:A:157:ASP:O	1:A:161:SER:OG	2.30	0.41
1:A:855:GLU:O	1:A:859:ASN:ND2	2.47	0.41
1:A:923:LEU:HD11	1:A:976:VAL:HG21	2.01	0.41
1:A:442:LEU:HD23	1:A:442:LEU:HA	1.85	0.41
1:A:571:ASN:O	1:A:767:ASN:ND2	2.44	0.41
1:A:1302:LEU:HD11	2:B:392:SER:CB	2.47	0.41
2:B:278:LEU:HD21	2:B:394:GLU:HB3	2.02	0.41
2:B:655:SER:OG	2:B:656:GLU:OE1	2.36	0.41
1:A:297:LEU:HD23	1:A:309:ILE:HG23	2.02	0.41
2:B:438:PHE:HB3	2:B:439:PRO:CD	2.49	0.41
1:A:696:ALA:O	1:A:753:ARG:NH2	2.47	0.41
1:A:1302:LEU:HD12	2:B:94:GLU:HG2	2.01	0.41
2:B:239:LEU:HG	2:B:242:TYR:CE2	2.55	0.41
2:B:1100:SER:HB2	2:B:1115:LYS:HD2	2.03	0.41
1:A:922:HIS:CD2	2:B:1020:SER:O	2.74	0.41
1:A:1047:SER:HB2	1:A:1084:ILE:HG23	2.02	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:885:ILE:HB	2:B:888:GLU:HG3	2.01	0.41
1:A:26:LEU:HD12	1:A:26:LEU:HA	1.95	0.41
1:A:254:HIS:ND1	1:A:295:GLU:OE2	2.54	0.41
2:B:47:GLN:HB3	2:B:51:GLU:HB2	2.02	0.41
2:B:578:ARG:HE	2:B:581:ARG:HD3	1.85	0.41
1:A:241:LEU:HD12	1:A:241:LEU:HA	1.95	0.41
1:A:579:SER:OG	1:A:580:LYS:HD2	2.20	0.41
1:A:570:ILE:HG12	1:A:592:LEU:HD21	2.02	0.40
2:B:704:LEU:HB2	2:B:709:ILE:HD13	2.03	0.40
1:A:281:ARG:H	1:A:483:TYR:HB3	1.86	0.40
1:A:1133:HIS:O	1:A:1138:TYR:OH	2.28	0.40
2:B:890:TYR:HB3	2:B:1040:ILE:HG23	2.04	0.40
1:A:416:PRO:HD2	1:A:477:PRO:HB3	2.03	0.40
1:A:372:ASN:OD1	1:A:372:ASN:N	2.53	0.40
1:A:1037:VAL:HG22	1:A:1050:VAL:HG22	2.02	0.40
1:A:358:ASP:OD1	1:A:358:ASP:N	2.54	0.40
1:A:710:MET:HE2	1:A:723:MET:HG2	2.04	0.40
1:A:873:THR:HG22	1:A:876:ARG:HH22	1.86	0.40
1:A:922:HIS:HB2	1:A:937:TYR:CZ	2.57	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	1333/1371 (97%)	1215 (91%)	116 (9%)	2 (0%)	44 74
2	B	1193/1458 (82%)	1104 (92%)	85 (7%)	4 (0%)	37 68
All	All	2526/2829 (89%)	2319 (92%)	201 (8%)	6 (0%)	45 74

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	579	SER
2	B	241	PRO
2	B	302	ALA
2	B	242	TYR
1	A	1166	TYR
2	B	898	ASP

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1190/1218 (98%)	1186 (100%)	4 (0%)	91	96
2	B	1090/1330 (82%)	1078 (99%)	12 (1%)	70	86
All	All	2280/2548 (90%)	2264 (99%)	16 (1%)	80	91

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	575	LYS
1	A	576	LEU
1	A	658	ILE
1	A	806	MET
2	B	93	LEU
2	B	164	LEU
2	B	239	LEU
2	B	240	GLN
2	B	241	PRO
2	B	332	VAL
2	B	355	THR
2	B	386	VAL
2	B	626	TYR
2	B	722	LEU
2	B	782	THR
2	B	897	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (29) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	53	ASN
1	A	104	GLN
1	A	158	GLN
1	A	184	ASN
1	A	303	HIS
1	A	390	GLN
1	A	445	GLN
1	A	572	HIS
1	A	632	GLN
1	A	650	GLN
1	A	730	GLN
1	A	819	ASN
1	A	931	GLN
1	A	958	GLN
1	A	1076	GLN
2	B	145	ASN
2	B	212	GLN
2	B	344	ASN
2	B	362	GLN
2	B	524	GLN
2	B	570	GLN
2	B	591	ASN
2	B	643	GLN
2	B	688	GLN
2	B	733	ASN
2	B	777	ASN
2	B	825	HIS
2	B	865	ASN
2	B	996	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.

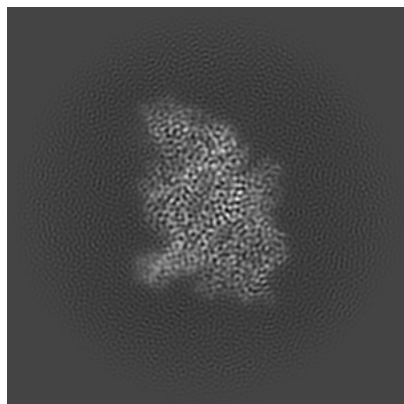
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-16475. These allow visual inspection of the internal detail of the map and identification of artifacts.

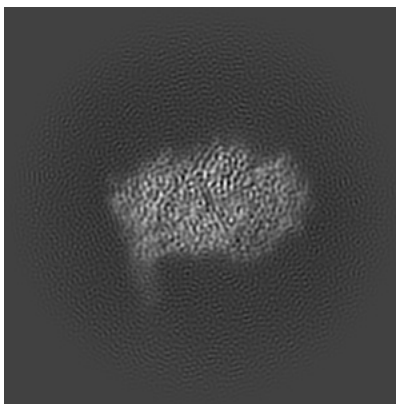
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

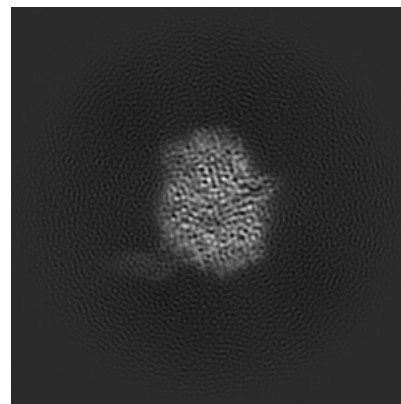
6.1.1 Primary map



X

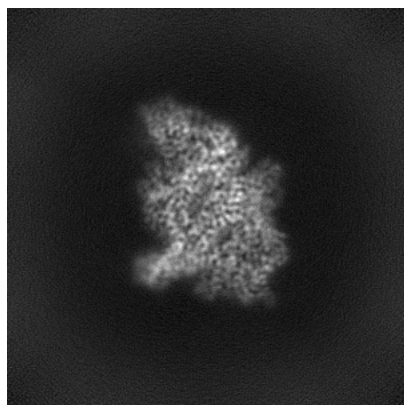


Y

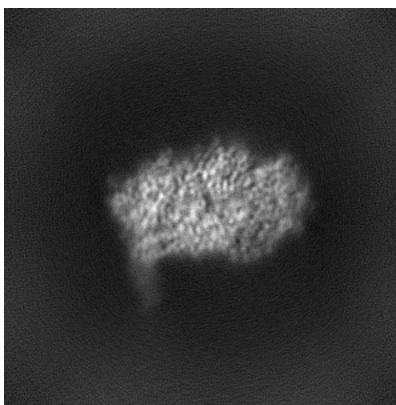


Z

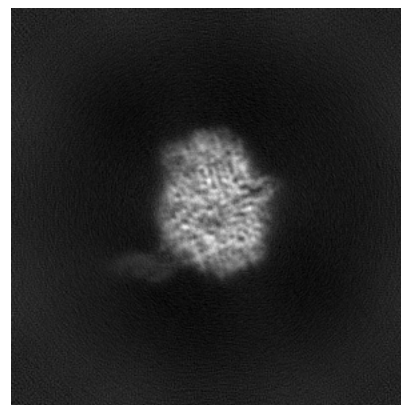
6.1.2 Raw map



X



Y

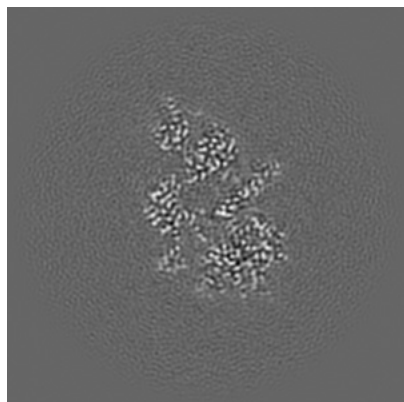


Z

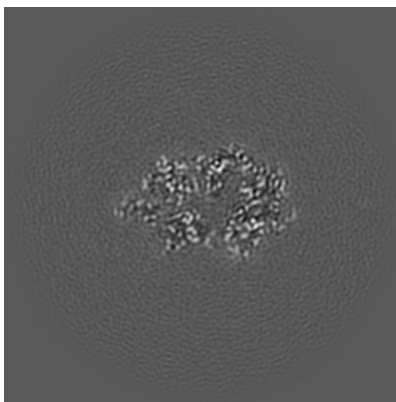
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

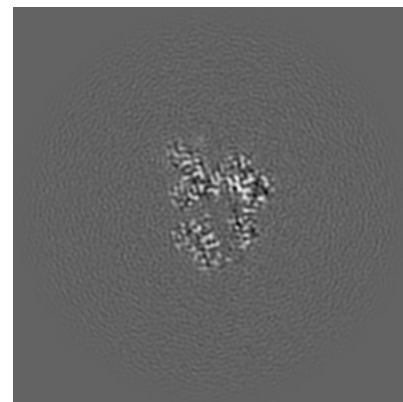
6.2.1 Primary map



X Index: 160

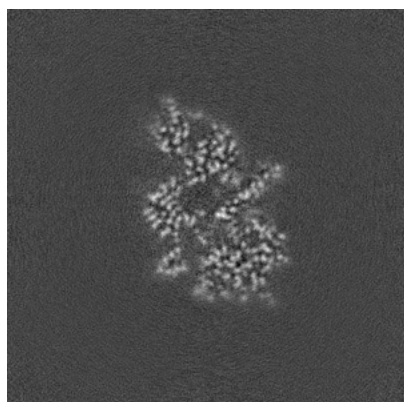


Y Index: 160

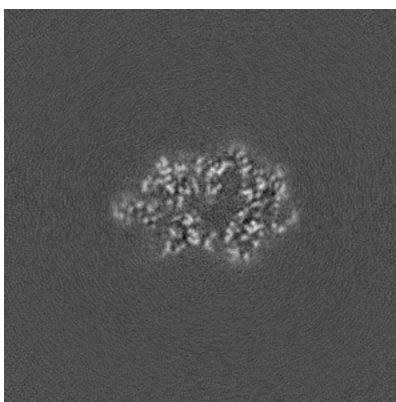


Z Index: 160

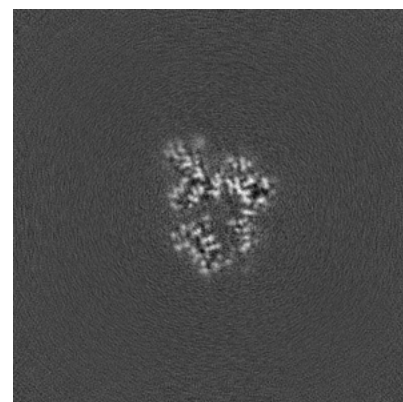
6.2.2 Raw map



X Index: 160



Y Index: 160

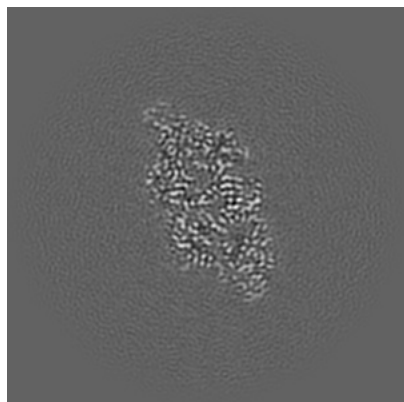


Z Index: 160

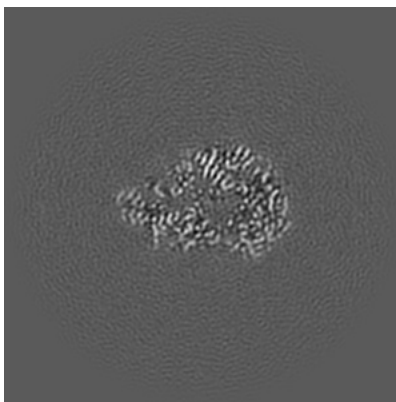
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

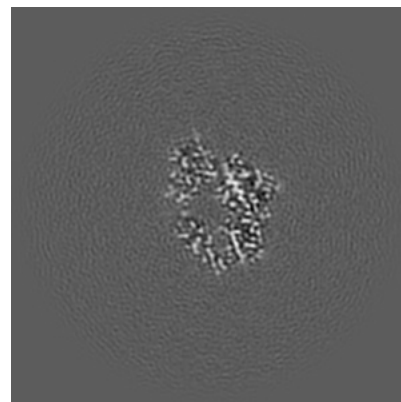
6.3.1 Primary map



X Index: 178

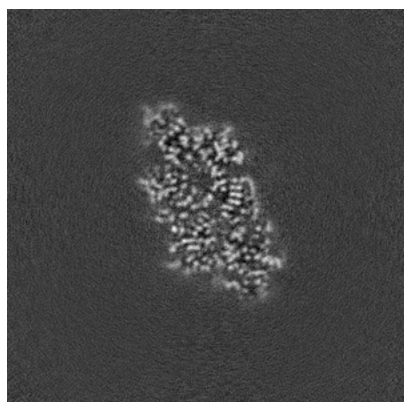


Y Index: 166

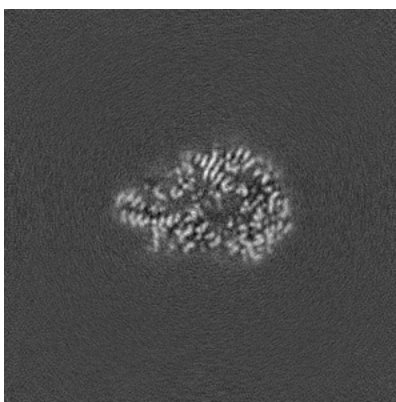


Z Index: 171

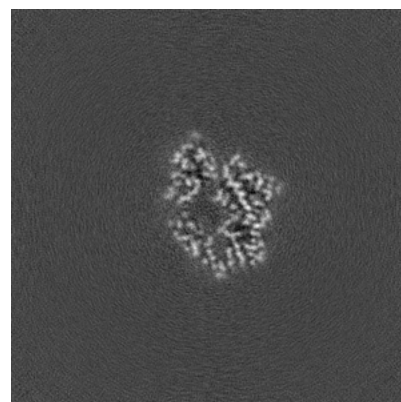
6.3.2 Raw map



X Index: 175



Y Index: 166

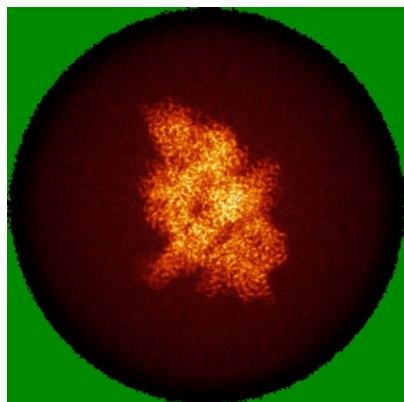


Z Index: 172

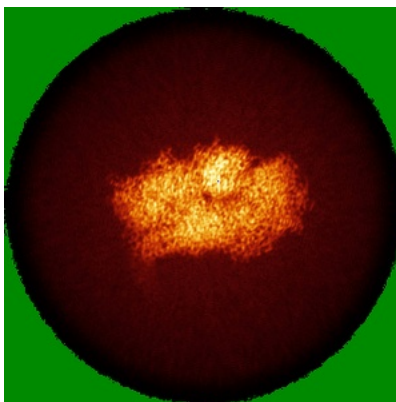
The images above show the largest variance slices of the map in three orthogonal directions.

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

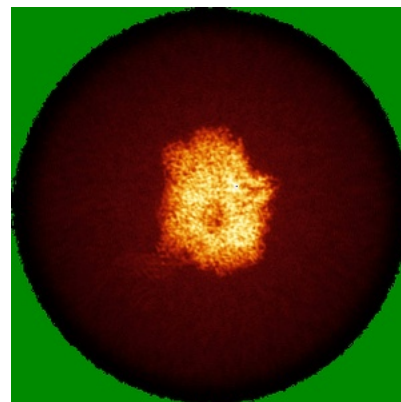
6.4.1 Primary map



X

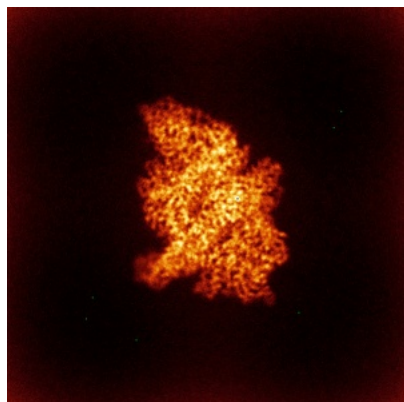


Y

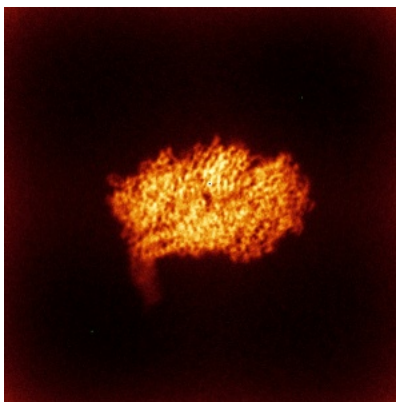


Z

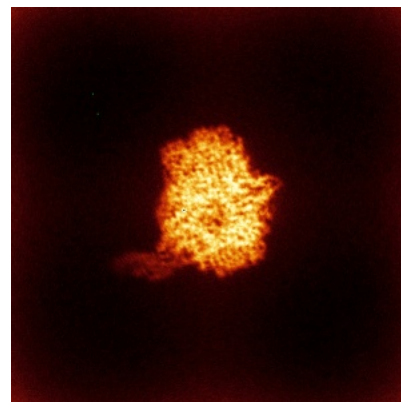
6.4.2 Raw map



X



Y

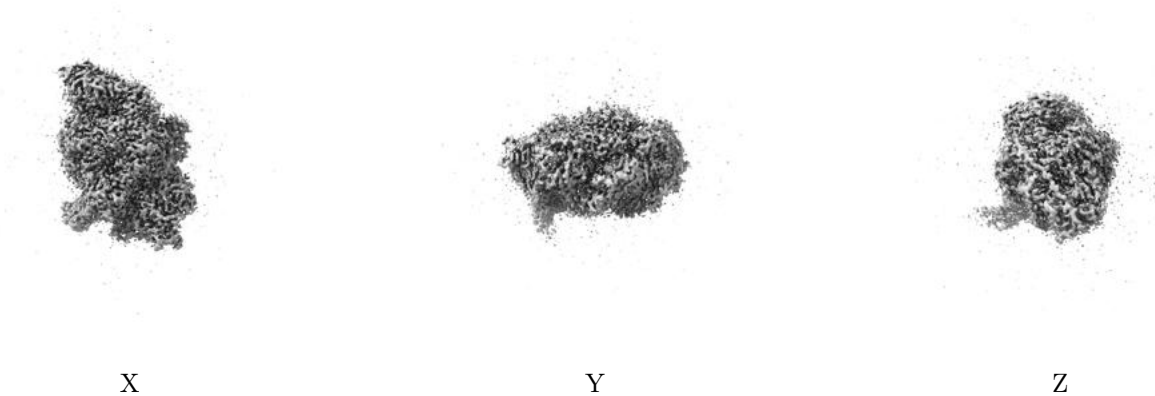


Z

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.

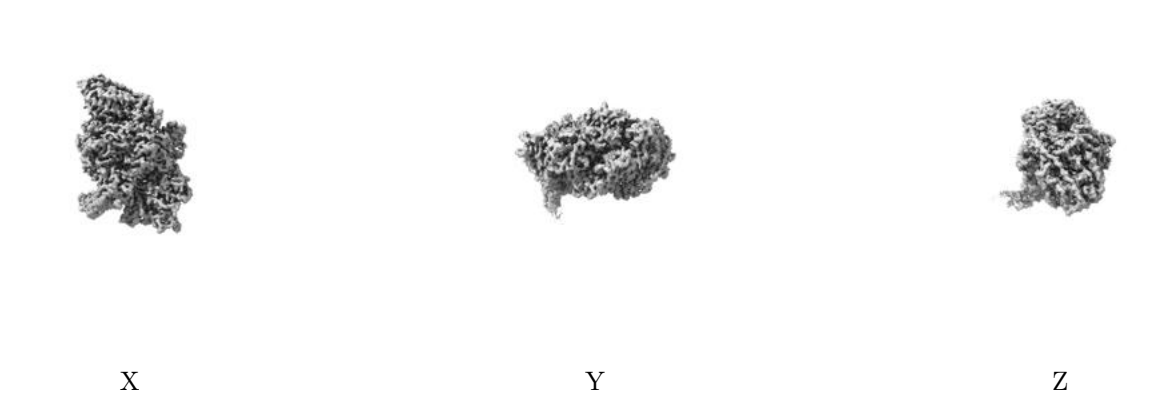
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.124. 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.

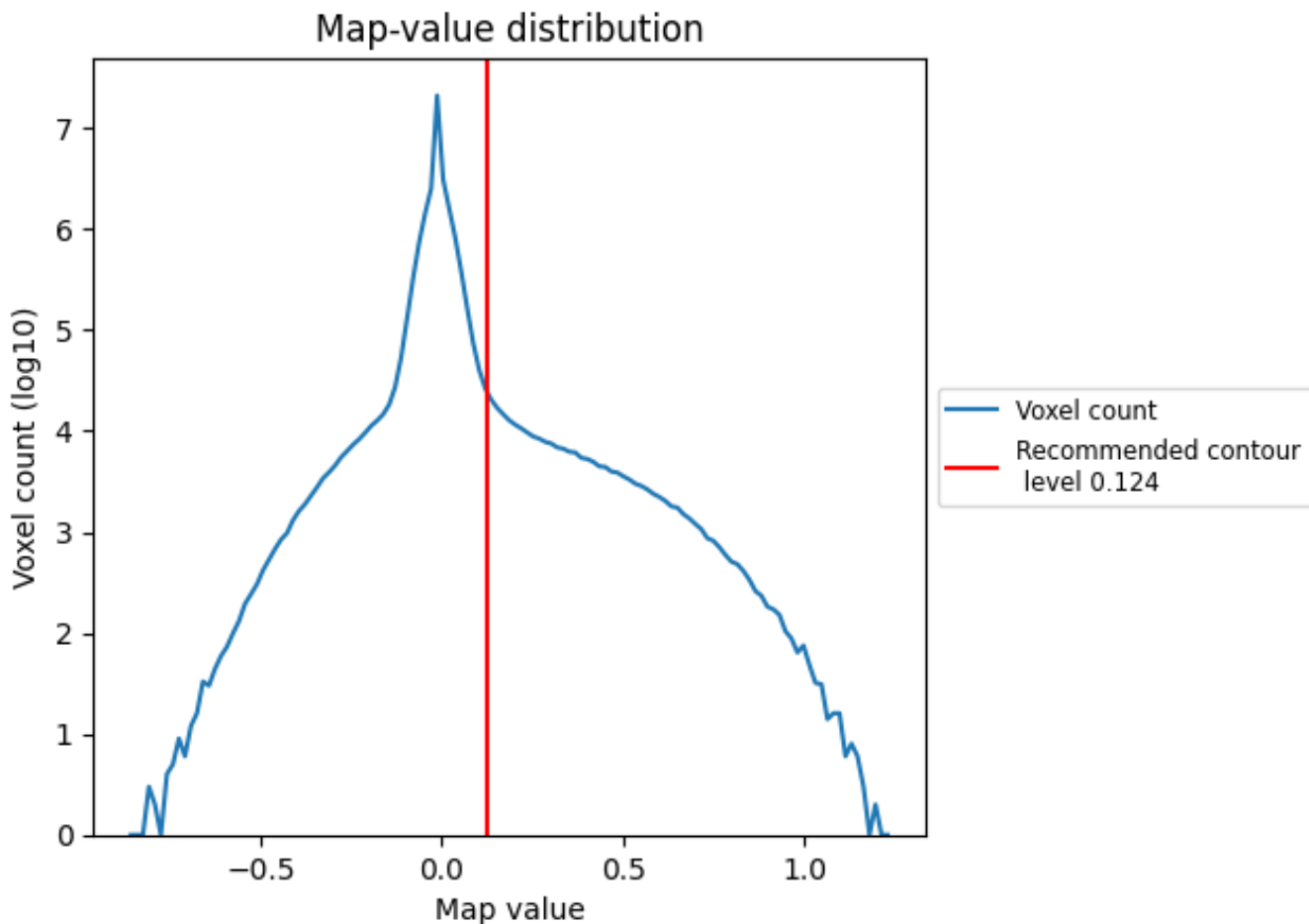
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

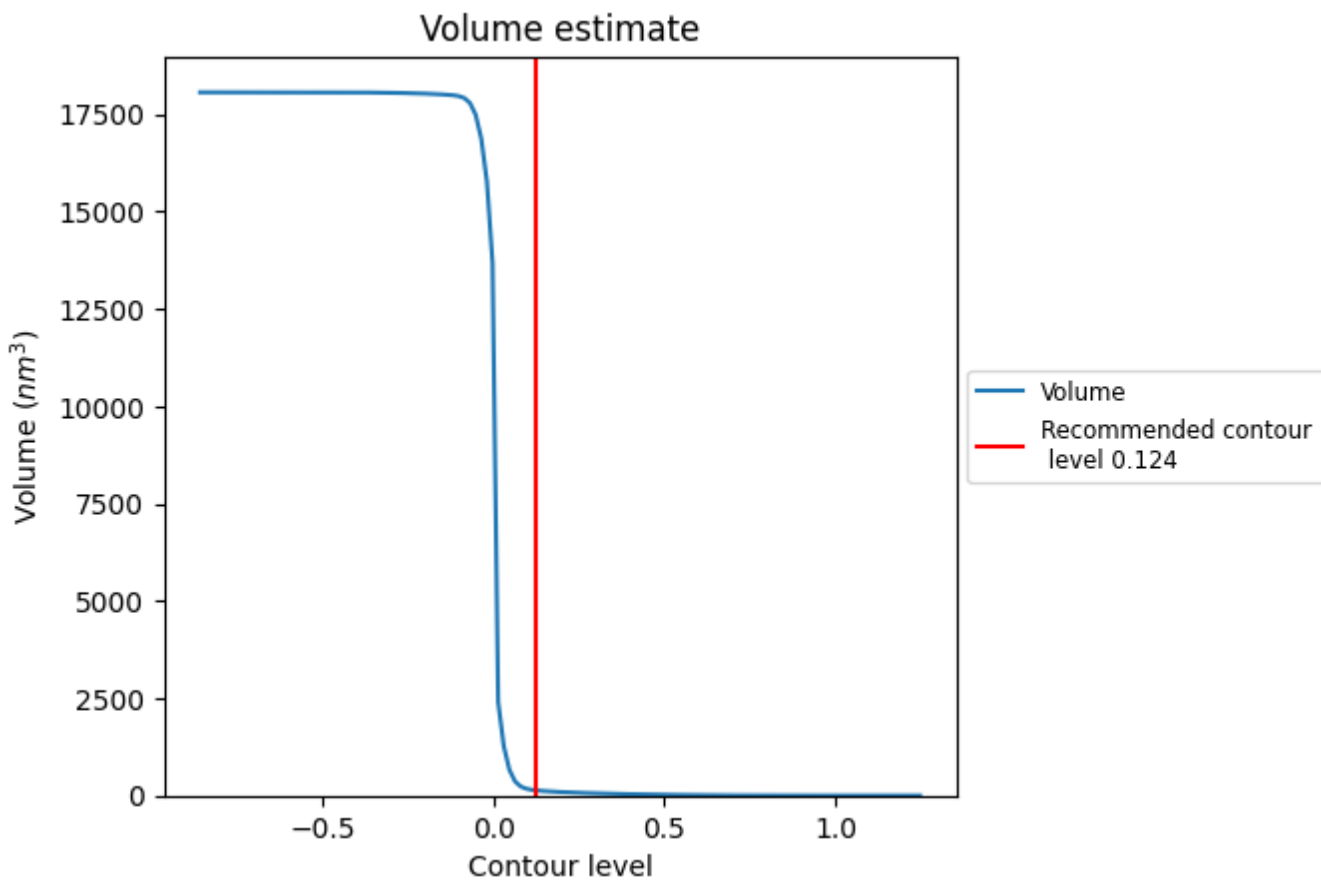
This section contains the results of statistical analysis of the map.

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.

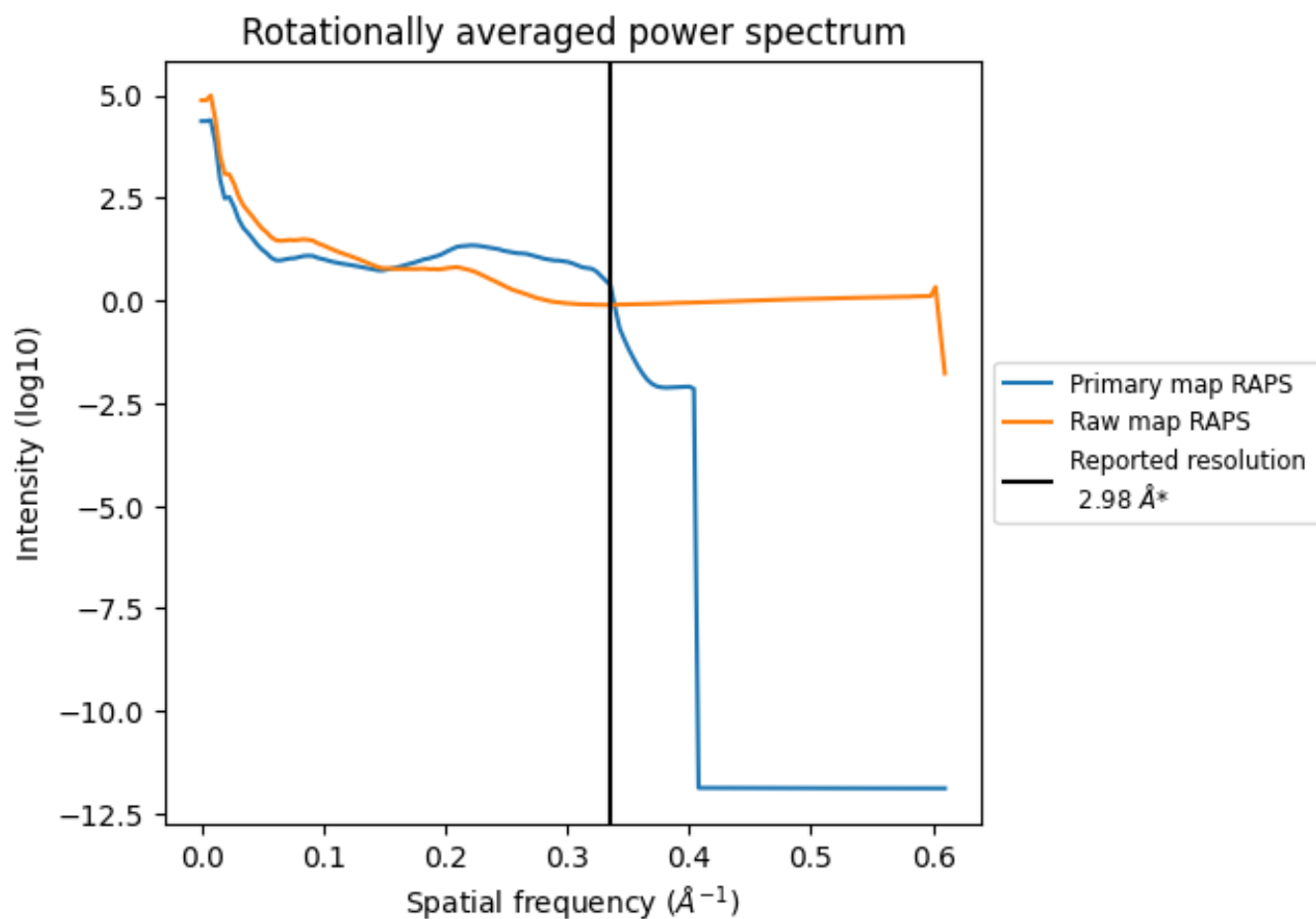
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 135 nm³; this corresponds to an approximate mass of 122 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](#)

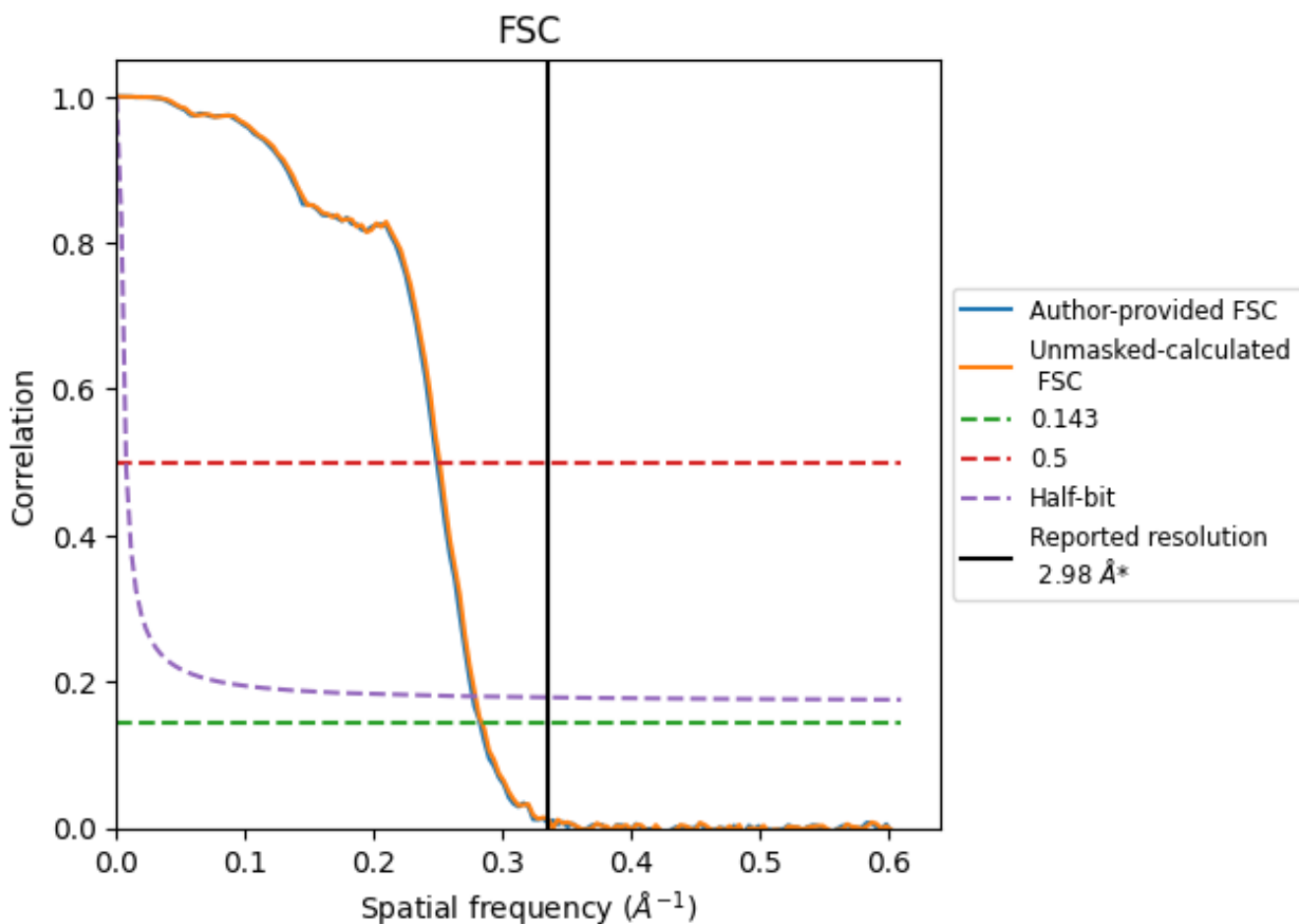


*Reported resolution corresponds to spatial frequency of 0.336 Å⁻¹

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 0.336 Å⁻¹

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.98	-	-
Author-provided FSC curve	3.54	4.02	3.61
Unmasked-calculated*	3.52	3.98	3.58

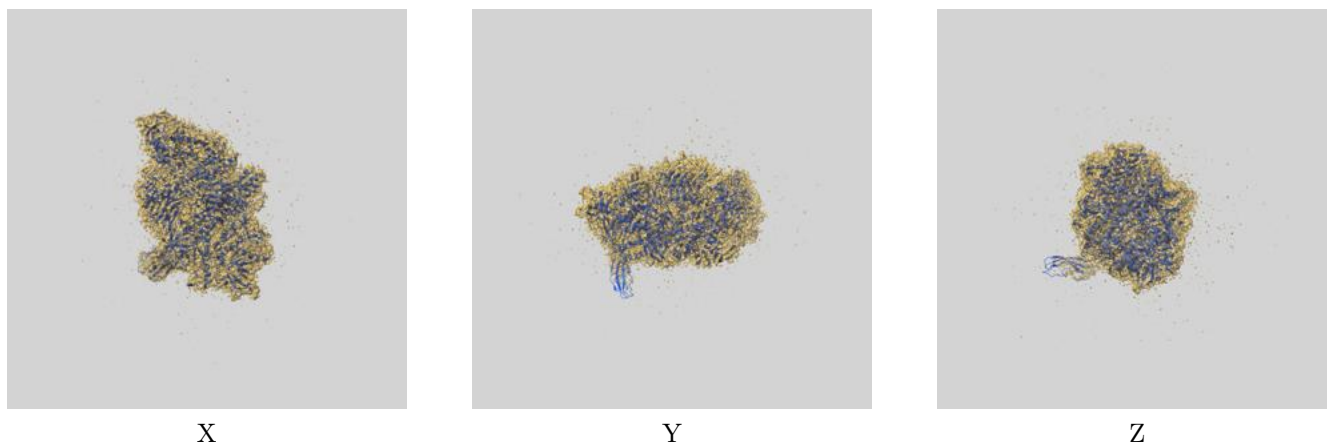
*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from author-provided FSC intersecting FSC 0.143 CUT-OFF 3.54 differs from the reported value 2.98 by more than 10 %

The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.52 differs from the reported value 2.98 by more than 10 %

9 Map-model fit [i](#)

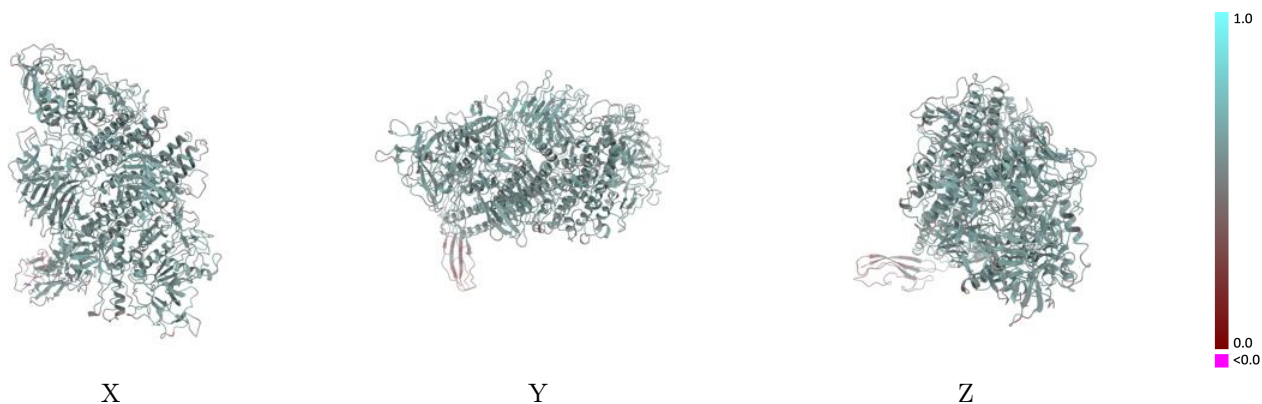
This section contains information regarding the fit between EMDB map EMD-16475 and PDB model 8C8G. Per-residue inclusion information can be found in section 3 on page 5.

9.1 Map-model overlay [i](#)



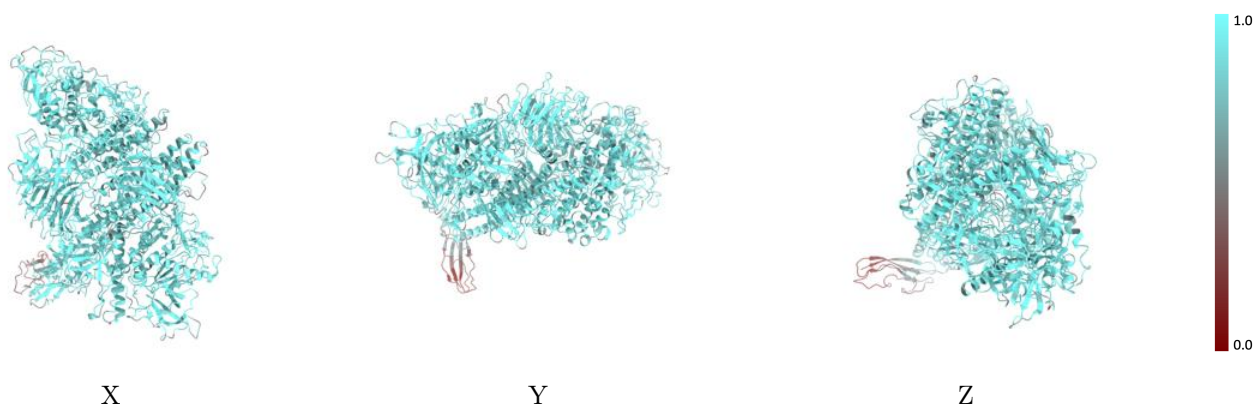
The images above show the 3D surface view of the map at the recommended contour level 0.124 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



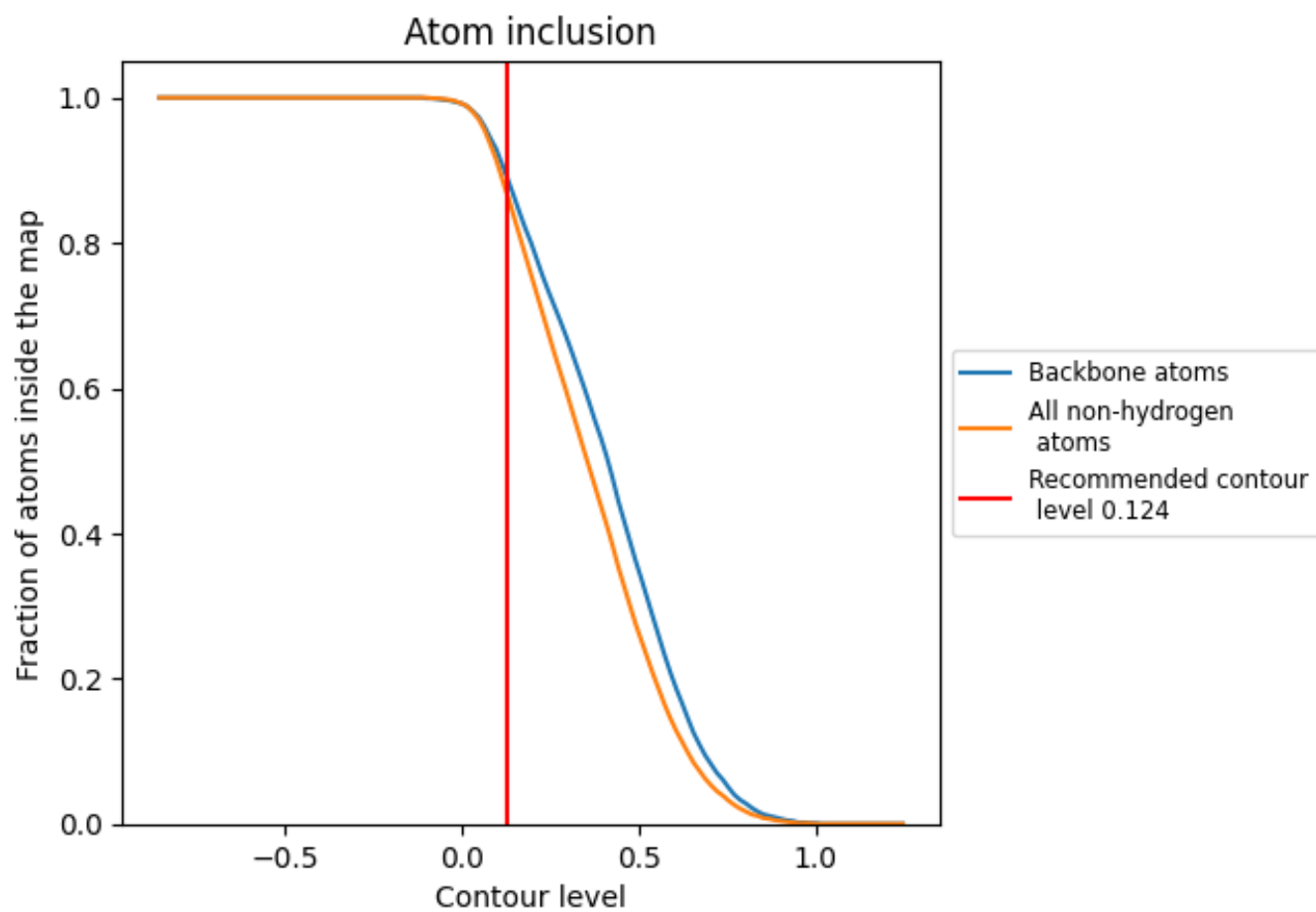
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.124).







9.4 Atom inclusion [i](#)



At the recommended contour level, 89% of all backbone atoms, 87% 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 (0.124) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8710	 0.5630
A	 0.8920	 0.5710
B	 0.8490	 0.5530

