



# wwPDB EM Validation Summary Report ⓘ

Mar 13, 2024 – 12:39 PM JST

PDB ID : 3J2A  
EMDB ID : EMD-5502  
Title : Dissecting the in vivo assembly of the 30S ribosomal subunit reveals the role of RimM  
Authors : Guo, Q.; Goto, S.; Chen, Y.; Muto, A.; Himeno, H.; Deng, H.; Lei, J.; Gao, N.  
Deposited on : 2012-09-28  
Resolution : 13.10 Å (reported)  
Based on initial model : 3OFA

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

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev70  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

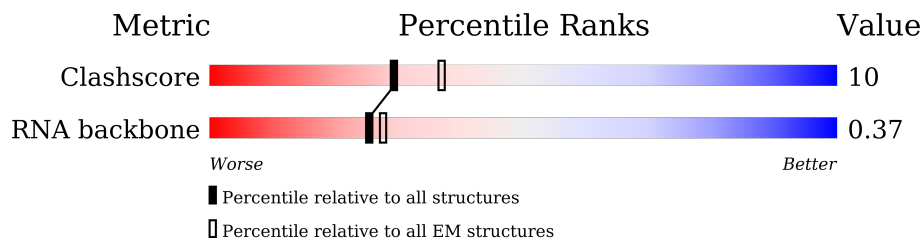
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 13.10 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	158937	4297
RNA backbone	4643	859

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  $\geq 3$ , 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	N	1533	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 49446 atoms, of which 16554 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.

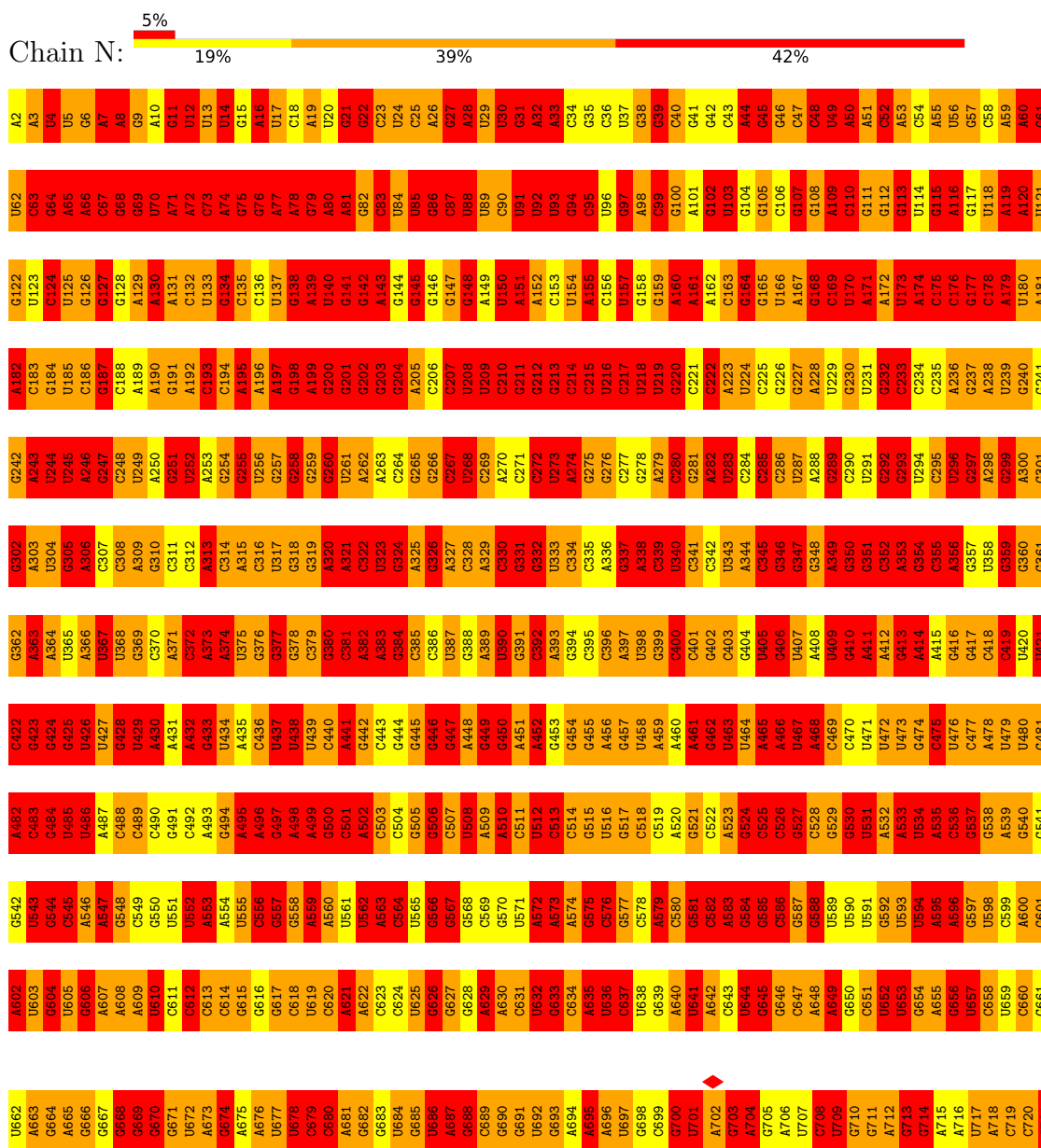
- Molecule 1 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
1	N	1533	49446	14671	16554	6036	10653	1532	0	0

### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

#### • Molecule 1: 16S rRNA



A1502	G1442	C1382	U1202	A1022	C962	G802	U842	A782	G722
A1503	C1443	C1383	C1203	U1023	G963	G903	U843	C783	U723
G1504	C1444	U1324	A1204	U1084	G1084	U904	G844	A784	G724
G1505	U1444	C1325	A1205	U1085	U965	U905	A844	A785	G725
U1506	A1445	U1326	G1206	U1086	G966	A906	G846	G786	C726
A1507	U1446	G1327	C1207	U1087	C967	A907	G847	G787	C727
A1508	A1447	C1328	C1208	U1088	A968	A908	C848	U788	A728
C1509	C1448	A1329	U1209	G1089	A969	A909	G849	U789	A729
C1510	C1449	U1330	C1210	U1090	C970	C910	U850	A790	G730
G1511	U1450	A1331	A1211	U1091	G971	U911	G851	G791	C731
U1512	U1451	G1332	U1212	A1092	C972	C912	G852	A792	G732
A1513	C1452	A1333	A1213	U1093	A973	A913	C853	G793	C733
G1514	G1453	C1334	C1214	G1094	G974	A914	U854	A794	G734
G1515	G1454	U1335	G1215	U1095	A975	A915	U855	C795	C735
G1516	U1455	C1336	A1216	C1096	G976	U916	C856	C796	C736
G1517	G1456	G1337	C1217	A1097	A977	G917	C857	G797	C737
A1518	U1457	C1338	A1218	C1098	A978	A918	U858	U798	C738
A1519	G1458	A1339	U1219	U1099	C979	A919	G859	G799	C739
C1520	G1459	U1340	G1220	C1100	U981	U921	A860	G800	U740
U1521	C1460	C1341	G1221	A1101	U982	G922	C861	U801	G741
G1522	C1461	U1342	U1222	U1102	U983	A923	C862	A802	G742
G1523	C1462	C1343	C1223	C1103	A983	C924	U863	G803	A743
C1524	U1463	G1344	U1224	U1104	C984	C924	A864	U804	C744
G1525	U1464	U1345	U1225	A1105	C985	G925	A865	C805	G745
G1526	C1465	U1346	A1226	U1106	U986	G926	C866	C806	G746
U1527	U1466	G1347	U1227	C1107	G987	G927	C867	A807	A747
U1528	U1467	U1348	C1228	G1108	U988	G928	C868	C808	G748
G1529	U1468	A1349	A1229	U1109	A989	G929	G869	G809	A749
G1530	A1469	U1350	U1230	A1110	C990	C931	U870	C810	C750
U1531	C1470	C1351	U1231	A1111	U991	C931	U871	C811	C751
U1532	U1471	C1352	U1232	C1112	U992	C932	A872	G812	G752
C1533	U1472	G1353	C1233	U1113	C993	C933	A873	U813	A753
A1534	C1473	U1354	U1234	G1114	A994	C934	G874	A814	C754
	U1474	C1355	U1235	U1115	C995	A935	U875	A815	G755
	G1475	G1356	A1236	U1116	A996	C936	C876	A816	C756
	A1476	A1357	U1237	A1117	U997	A937	A877	U817	U757
	U1477	U1358	U1238	U1118	C998	A938	A878	G818	C758
	U1478	C1359	A1239	C1119	C999	C939	C879	A819	A759
	C1479	A1360	U1240	U1120	A1000	C940	C880	U820	G760
	A1480	G1361	A1241	U1121	G1001	G941	G881	G821	G761
	U1481	C1362	C1242	U1122	U1002	G942	C882	U822	U762
	G1482	A1363	C1243	U1123	G1003	U943	C883	G823	G763
	A1483	U1364	G1244	G1124	A1004	G944	U884	G824	C764
	U1484	G1365	U1245	U1125	U1005	G945	G885	A825	G765
	C1485	C1366	A1246	U1126	G1006	A946	G886	C826	A766
	U1486	A1367	U1247	G1127	U1007	G947	G887	U827	A767
	G1487	U1368	A1248	U1128	G1008	C948	G888	U828	A768
	U1488	C1369	U1249	C1129	A1009	A949	A889	G829	G769
	A1489	G1370	G1250	U1130	U1010	U950	G890	G830	C770
	U1490	A1371	A1251	A1131	C1011	G951	U891	A831	G771
	G1491	U1372	C1252	C1132	U1012	U952	A892	G832	U772
	U1492	G1373	U1253	U1133	G1013	G953	C893	G833	G773
	A1493	A1374	A1254	G1134	A1014	G954	G894	U834	G774
	G1494	U1375	U1255	U1135	U1015	U955	G895	U835	G775
	U1495	A1376	A1256	U1136	A1016	U956	C896	G836	G776
	C1496	U1377	U1257	C1137	G1017	U957	U897	U837	A777
	U1497	C1378	A1258	G1138	U1018	A898	G898	G838	G778
	A1498	U1379	U1259	U1139	A1019	U959	C899	G839	C779
	U1499	C1380	G1260	U1140	A1020	U960	A900	A780	A780
	A1500	U1381	A1261	A1141	U1021	U961	A901	C841	A781

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	30262	Depositor
Resolution determination method	FSC 0.5 CUT-OFF	Depositor
CTF correction method	Weiner filter	Depositor
Microscope	FEI TECNAI F20	Depositor
Voltage (kV)	200	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	20	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	4000	Depositor
Magnification	80000	Depositor
Image detector	GATAN ULTRASCAN 4000 (4k x 4k)	Depositor
Maximum map value	4.176	Depositor
Minimum map value	-6.630	Depositor
Average map value	-3.903	Depositor
Map value standard deviation	0.568	Depositor
Recommended contour level	-2.8	Depositor
Map size ( $\text{\AA}$ )	345.0, 345.0, 345.0	wwPDB
Map dimensions	125, 125, 125	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	2.76, 2.76, 2.76	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	N	3.48	5331/36831 (14.5%)	4.00	9667/57458 (16.8%)

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	N	0	937

The worst 5 of 5331 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	N	1299	A	N7-C5	-19.75	1.27	1.39
1	N	787	A	N7-C5	-16.87	1.29	1.39
1	N	1367	C	N1-C6	16.52	1.47	1.37
1	N	1504	G	C6-N1	16.46	1.51	1.39
1	N	854	U	N3-C4	16.35	1.53	1.38

The worst 5 of 9667 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	1225	A	N1-C6-N6	28.69	135.81	118.60
1	N	438	U	P-O3'-C3'	28.20	153.54	119.70
1	N	1130	A	N1-C6-N6	26.64	134.58	118.60
1	N	889	A	N1-C6-N6	25.22	133.73	118.60
1	N	748	G	N1-C6-O6	25.02	134.91	119.90

There are no chirality outliers.

5 of 937 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	N	11	G	Sidechain
1	N	12	U	Sidechain
1	N	4	U	Sidechain
1	N	7	A	Sidechain
1	N	8	A	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	N	32892	16554	16528	504	0
All	All	32892	16554	16528	504	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

The worst 5 of 504 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:N:928:G:H21	1:N:1533:C:H42	1.24	0.85
1:N:67:C:H2'	1:N:68:G:C8	2.13	0.83
1:N:50:A:H1'	1:N:52:C:C6	2.23	0.73
1:N:1266:G:H21	1:N:1269:A:H8	1.39	0.70
1:N:1394:A:H3'	1:N:1395:C:H5'	1.74	0.69

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

There are no protein molecules in this entry.

### 5.3.2 Protein sidechains [i](#)

There are no protein molecules in this entry.



### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	N	1532/1533 (99%)	460 (30%)	145 (9%)

5 of 460 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	N	3	A
1	N	4	U
1	N	5	U
1	N	6	G
1	N	7	A

5 of 145 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	N	1228	C
1	N	1530	G
1	N	1282	C
1	N	1363	A
1	N	430	A

## 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 monosaccharides 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

There are no chain breaks in this entry.

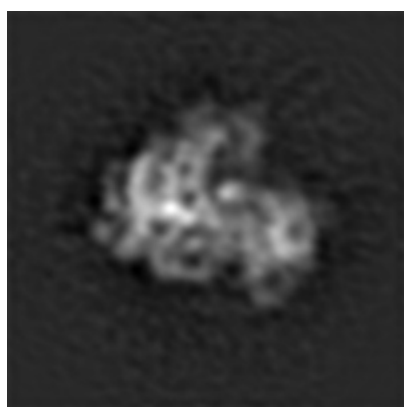
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-5502. These allow visual inspection of the internal detail of the map and identification of artifacts.

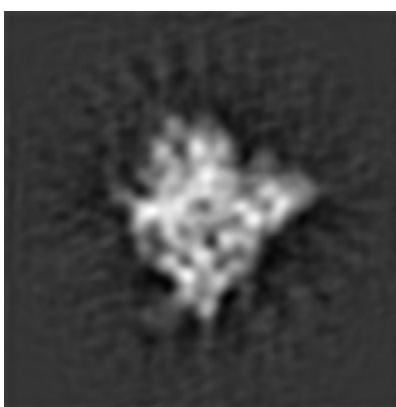
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections [i](#)

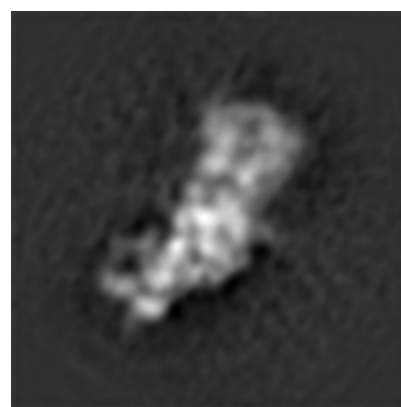
#### 6.1.1 Primary map



X



Y

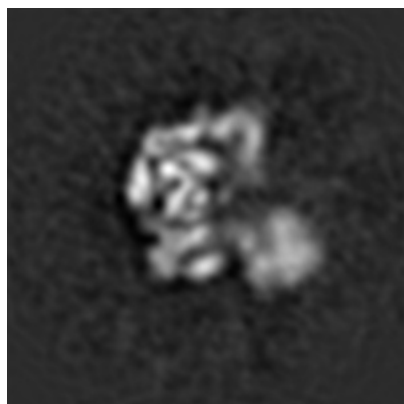


Z

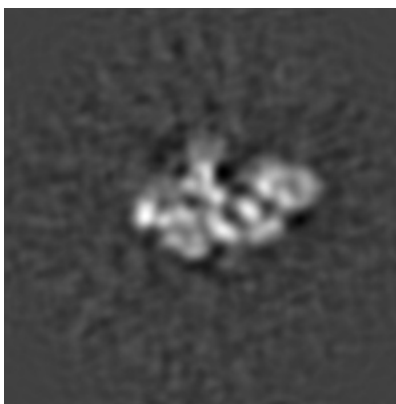
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

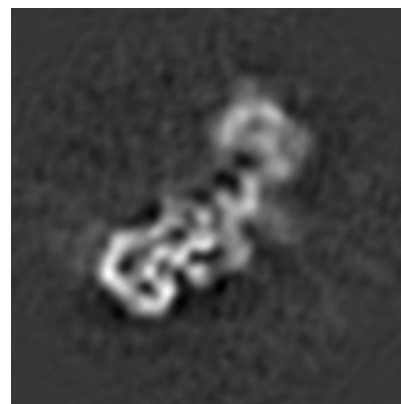
#### 6.2.1 Primary map



X Index: 62



Y Index: 62

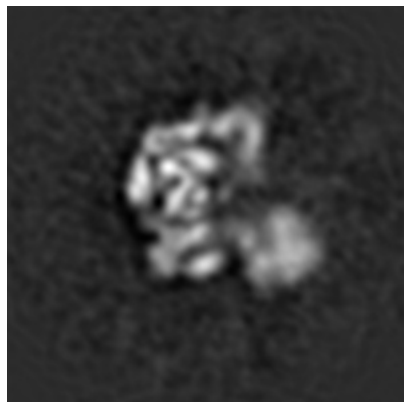


Z Index: 62

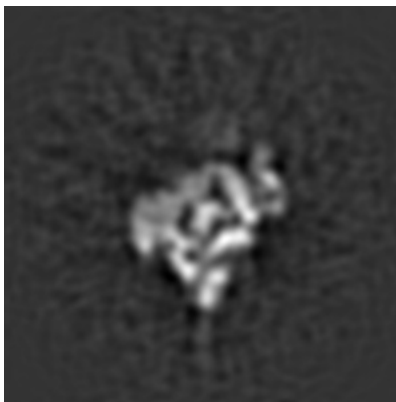
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [\(i\)](#)

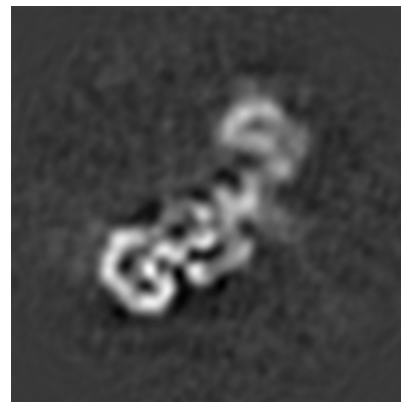
### 6.3.1 Primary map



X Index: 62



Y Index: 51

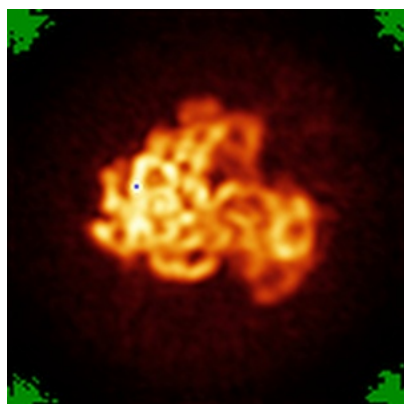


Z Index: 63

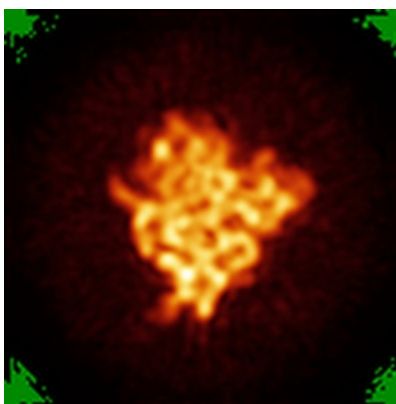
The images above show the largest variance slices of the map in three orthogonal directions.

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

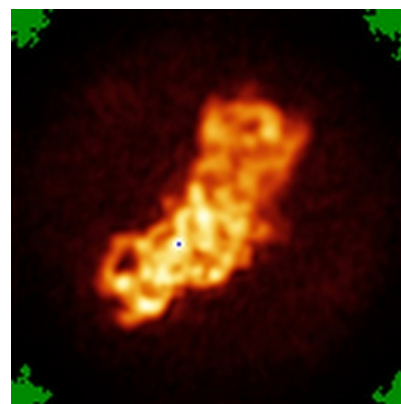
### 6.4.1 Primary map



X



Y

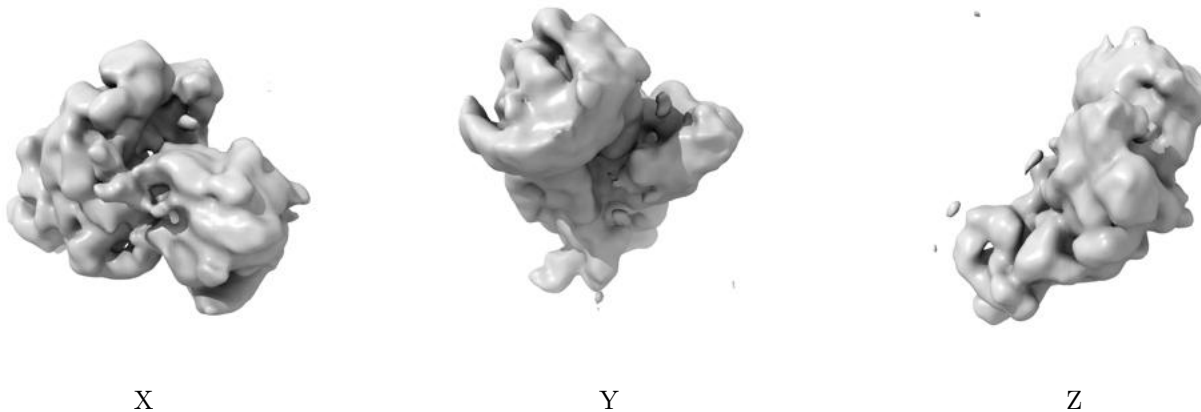


Z

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

## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level - 2.8. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

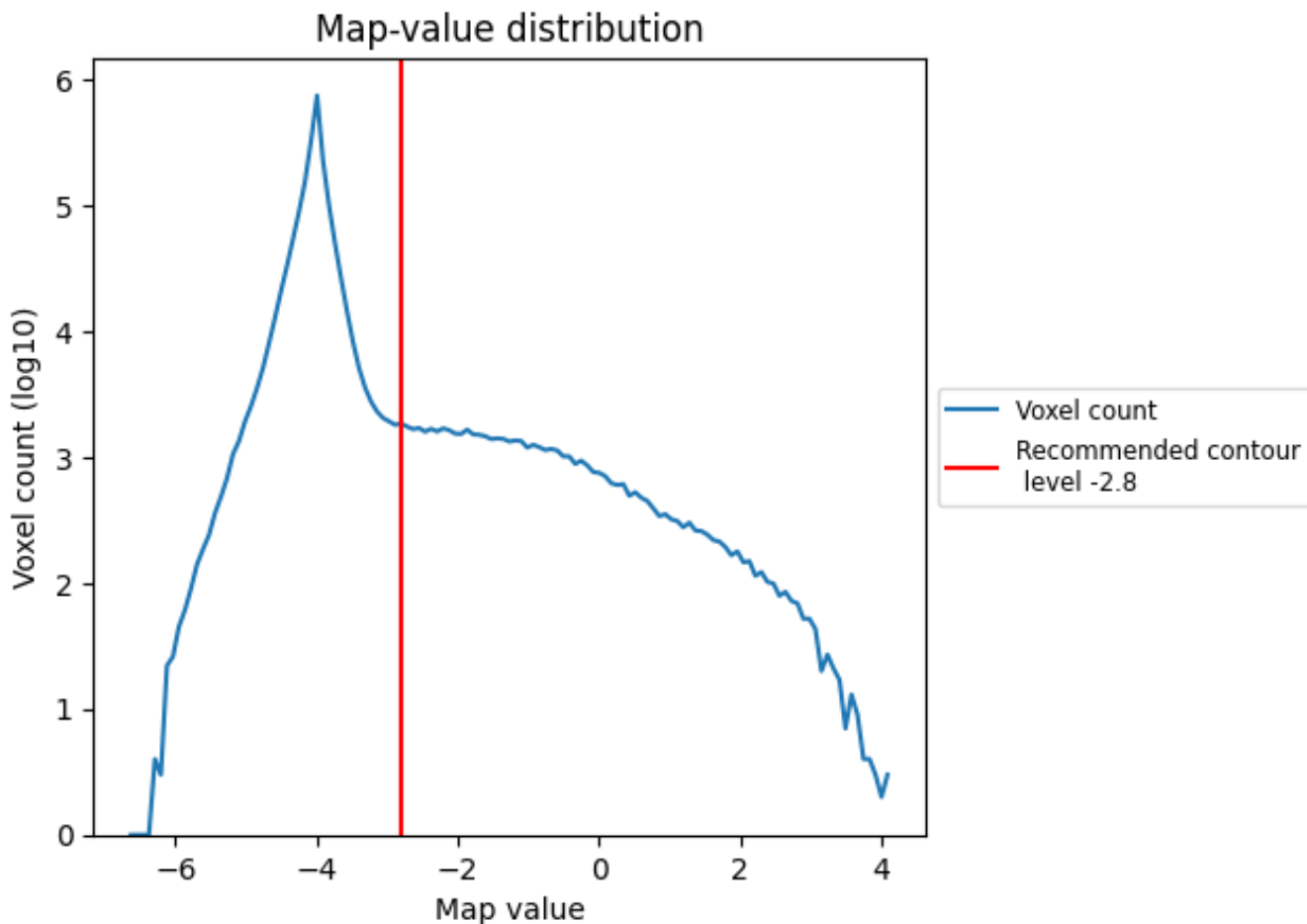
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

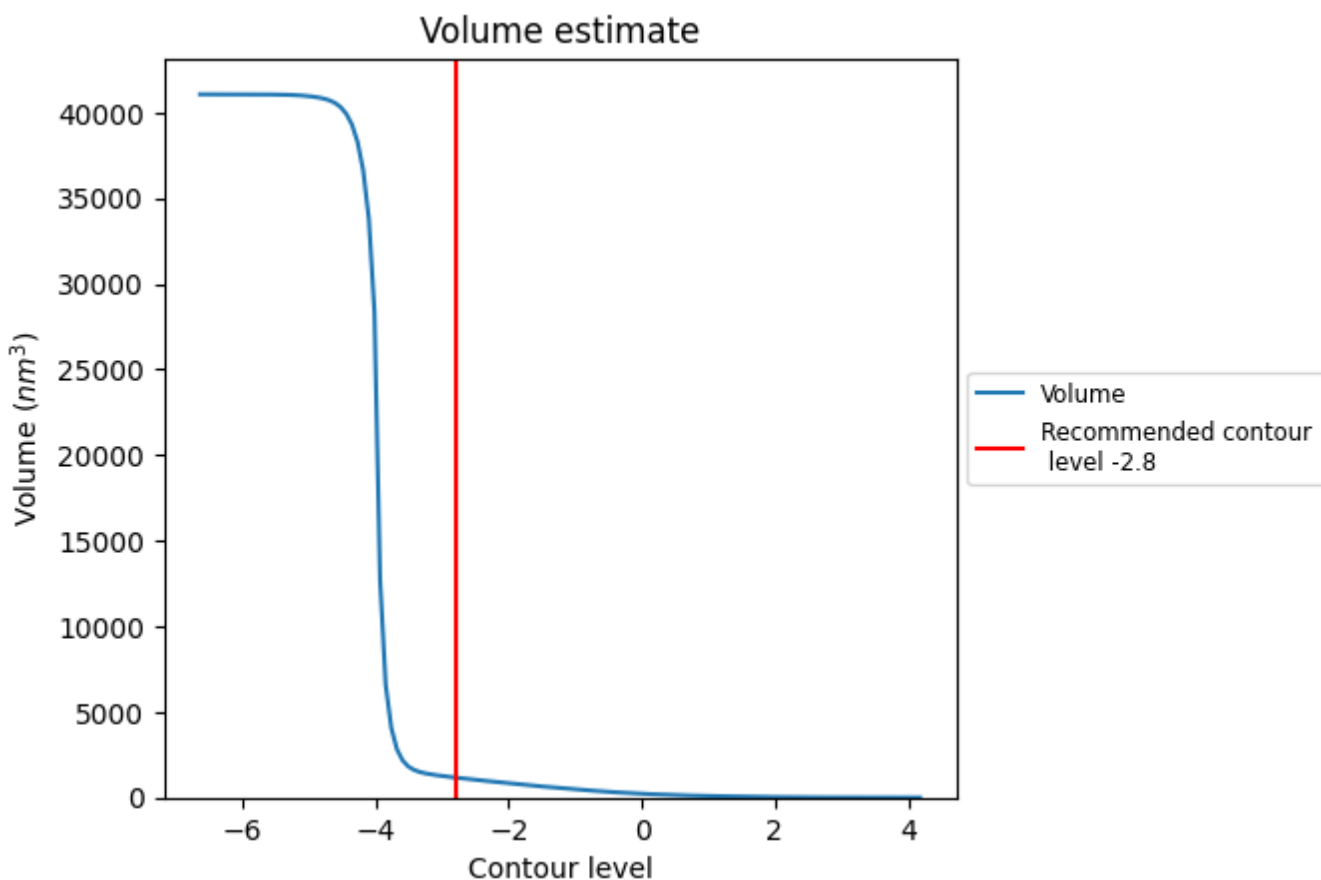
This section contains the results of statistical analysis of the map.

### 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.

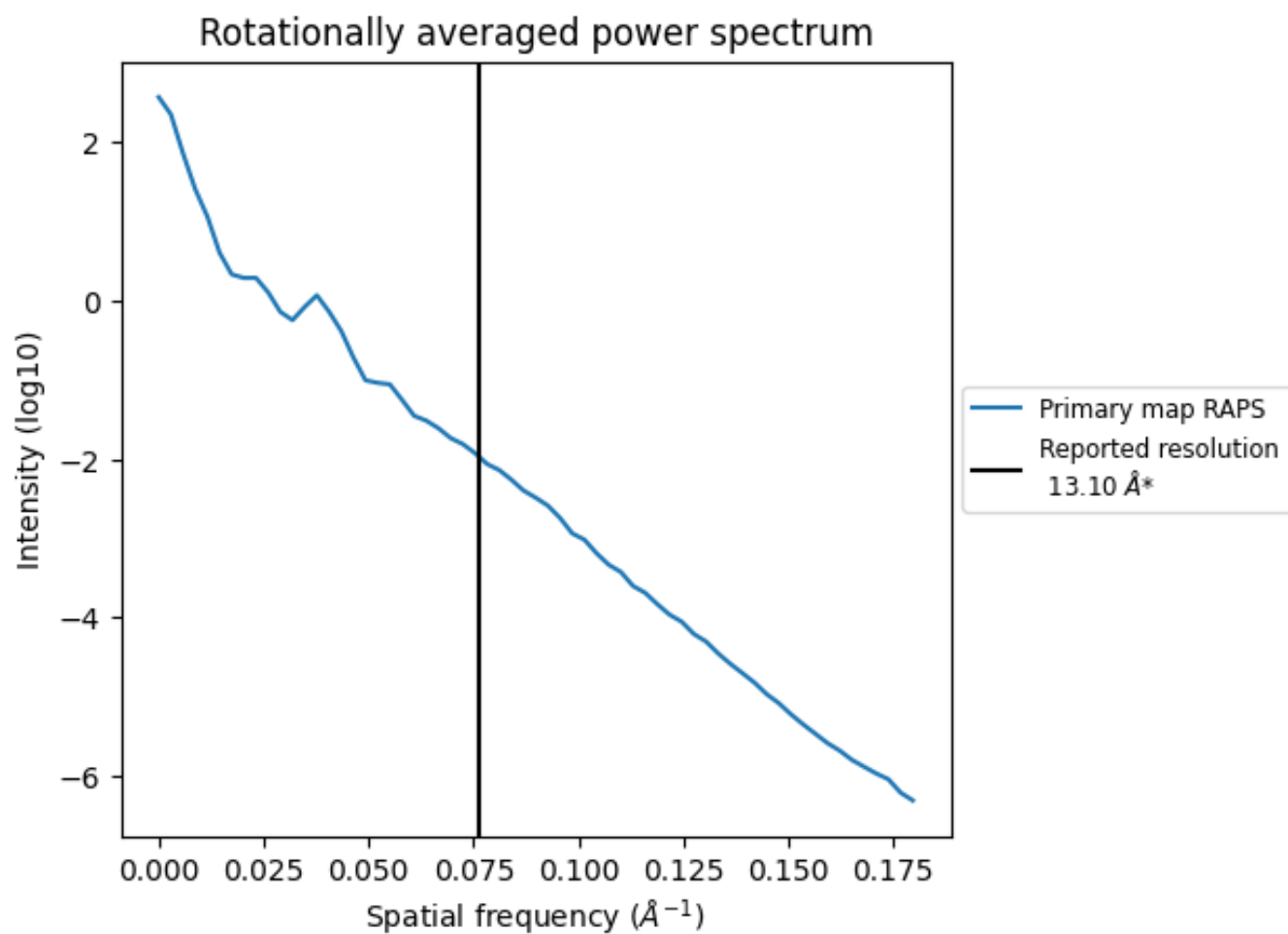
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1168 nm<sup>3</sup>; this corresponds to an approximate mass of 1055 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 0.076 Å<sup>-1</sup>



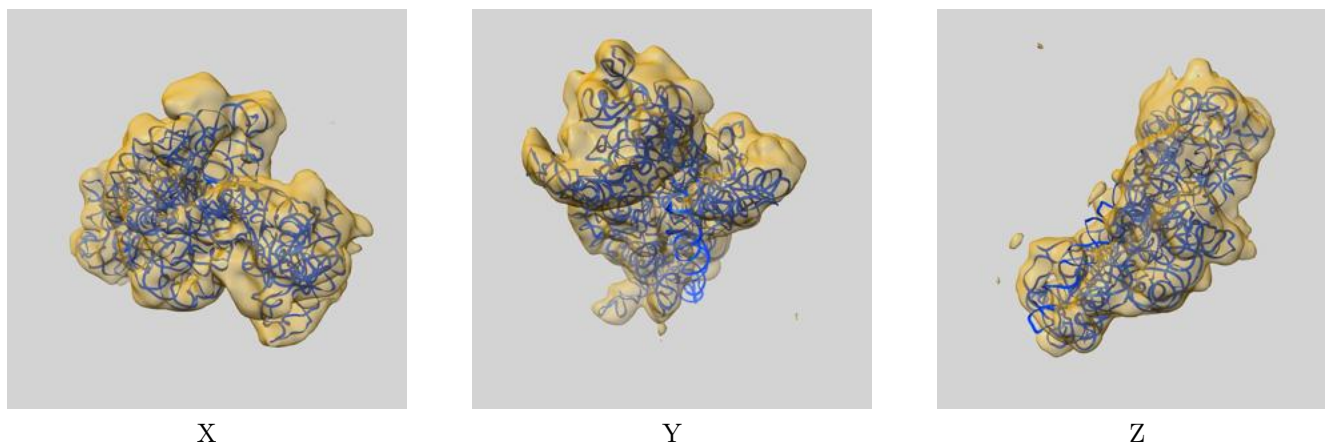
## 8 Fourier-Shell correlation

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

## 9 Map-model fit [i](#)

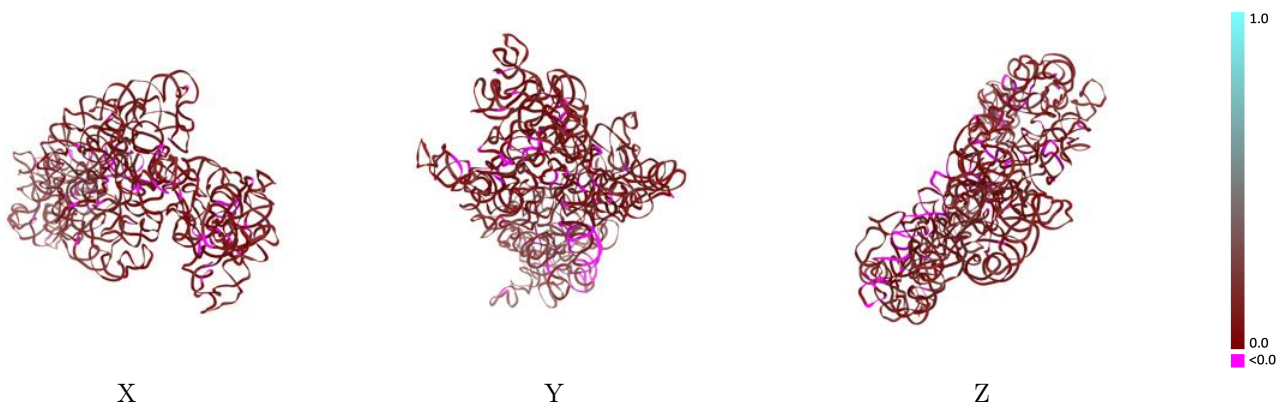
This section contains information regarding the fit between EMDB map EMD-5502 and PDB model 3J2A. Per-residue inclusion information can be found in section [3](#) on page [4](#).

### 9.1 Map-model overlay [i](#)



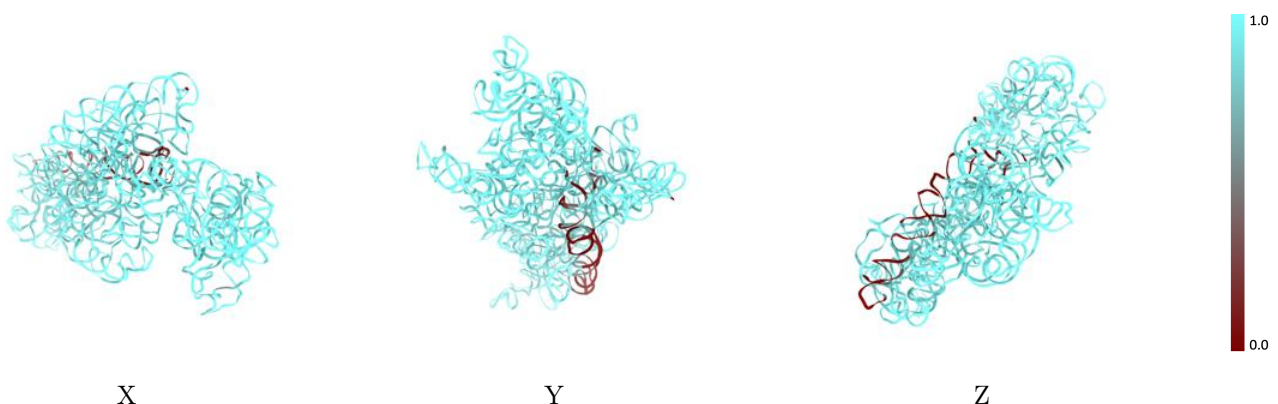
The images above show the 3D surface view of the map at the recommended contour level -2.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



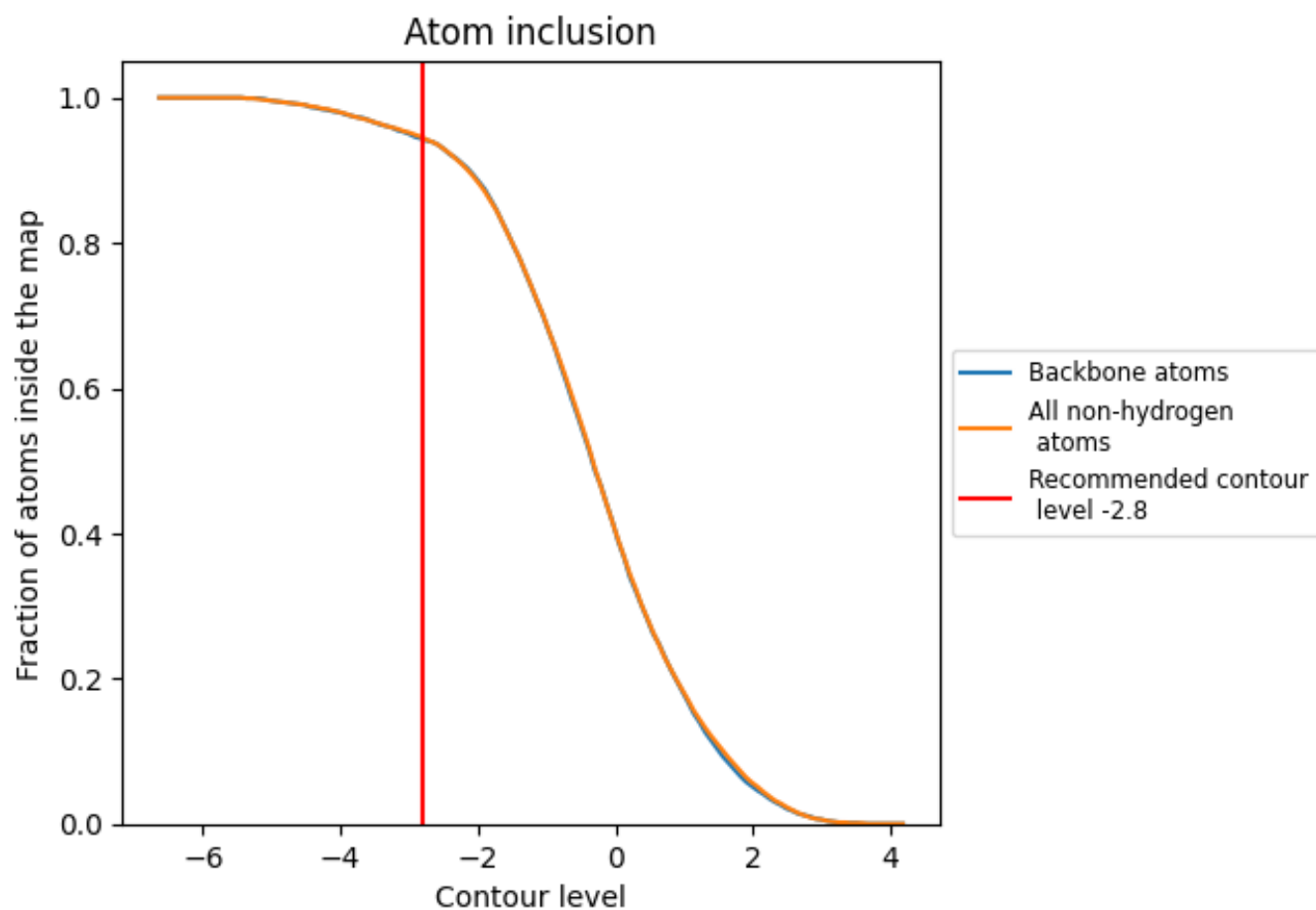
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (-2.8).





## 9.4 Atom inclusion [i](#)



At the recommended contour level, 94% of all backbone atoms, 94% 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 (-2.8) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9450	 0.0980
N	 0.9450	 0.0980

