



# wwPDB EM Validation Summary Report ⓘ

Mar 13, 2024 – 12:29 PM JST

PDB ID : 3J29  
EMDB ID : EMD-5501  
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 : 14.00 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

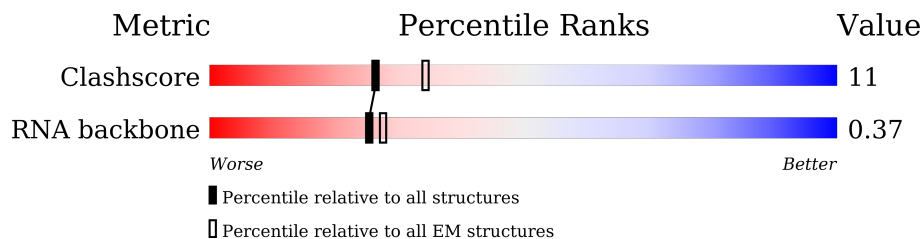
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 14.00 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.

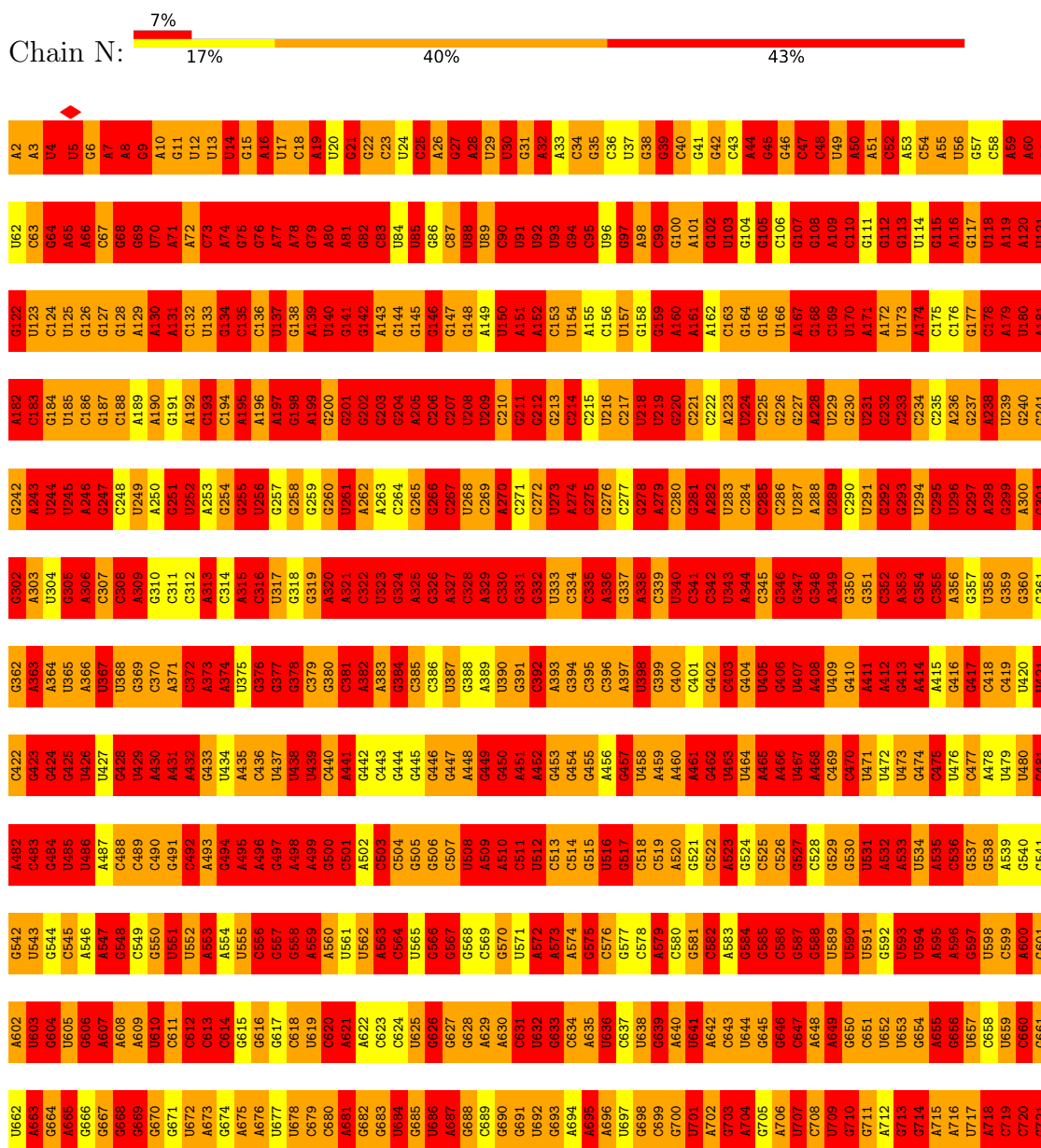
- Molecule 1 is a RNA chain called 16S rRNA.

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	A1503	G1504	G1505	U1506	A1507	A1508	C1448	C1449	U1450	U1451	C1452	G1453	G1454	A1455	A1456	G1457	G1458	C1459	C1460	G1461	C1462	U1463	U1464	A1465	C1466	C1467	A1468	C1469	U1470	U1471	U1472	G1473	U1474	G1475	A1476	U1477	U1478	C1479	U1481	A1482	A1483	C1484	U1485	G1486	G1487	G1488	C1489	U1490	C1491	A1492	A1493	G1494	U1495	C1496	C1497	U1498	A1499	A1500	C1501		
G1382	C1383	C1384	G1385	G1386	G1387	C1388	C1389	U1390	C1391	G1392	U1393	A1394	C1395	A1396	C1397	G1398	A1399	C1400	G1401	C1402	C1403	C1404	G1405	U1406	A1407	C1408	C1409	U1410	A1411	C1412	A1413	U1414	G1415	G1416	G1417	A1418	U1419	G1420	G1421	G1422	U1423	C1424	C1425	U1426	A1427	A1428	A1429	A1430	G1431	G1432	U1433	A1434	U1435	U1436	A1437	G1438	A1439	U1440	A1441		
C1262	C1263	U1264	C1265	G1266	C1267	C1268	C1269	C1270	U1271	A1272	C1273	U1274	A1275	G1276	C1277	U1278	A1279	C1280	C1281	U1282	U1283	C1284	A1285	U1286	A1287	A1288	A1289	U1290	U1291	C1292	C1293	U1294	U1295	C1296	G1297	U1298	A1299	G1300	U1301	C1302	C1303	G1304	G1305	U1306	U1307	U1308	G1309	A1310	G1311	U1312	U1313	C1314	G1315	U1316	C1317	U1318	U1319	C1320	A1321		
U1002	C1203	A1204	U1205	G1206	C1207	C1208	C1209	C1210	U1211	U1212	A1213	C1214	G1215	A1216	C1217	C1218	A1219	G1220	C1221	G1222	U1223	U1224	A1225	C1226	A1227	C1228	A1229	U1230	G1231	U1232	C1233	U1234	U1235	U1236	C1237	A1238	A1239	U1240	G1241	G1242	C1243	G1244	C1245	A1246	U1247	A1248	C1249	A1250	A1251	A1252	G1253	U1254	C1255	G1256	A1257	U1258	C1259	G1260	A1261		
G1142	G1143	U1144	A1145	U1146	G1147	U1148	C1149	U1150	A1151	U1152	G1153	U1154	A1155	U1156	A1157	U1158	U1159	G1160	C1161	C1162	A1163	G1164	U1165	G1166	A1167	U1168	A1169	U1170	A1171	C1172	U1173	G1174	U1175	A1176	U1177	U1178	A1179	U1180	G1181	U1182	U1183	G1184	U1185	G1186	U1187	U1188	U1189	A1190	A1191	C1192	G1193	U1194	C1195	A1196	U1197	G1198	U1199	C1200	A1201		
A1082	U1083	U1084	U1085	U1086	G1087	U1088	U1089	U1090	U1091	A1092	U1093	G1094	U1095	C1096	C1097	C1098	U1099	C1100	A1101	A1102	C1103	G1104	A1105	G1106	C1107	G1108	C1109	A1110	A1111	C1112	C1113	C1114	U1115	U1116	A1117	U1118	C1119	U1120	U1121	U1122	U1123	G1124	U1125	U1126	G1127	C1128	C1129	A1130	C1131	C1132	G1133	U1134	U1135	C1136	C1137	G1138	U1139	C1140	C1141		
A1022	U1023	G1024	U1025	G1026	C1027	C1028	U1029	U1030	C1031	G1032	G1033	U1034	A1035	U1036	C1037	C1038	A1039	U1040	G1041	A1042	G1043	U1044	C1045	A1046	G1047	U1048	U1049	G1050	C1051	U1052	G1053	C1054	U1055	U1056	G1057	G1058	C1059	U1060	G1061	U1062	C1063	U1064	C1065	U1066	A1067	G1068	C1069	U1070	A1071	U1072	G1073	G1074	U1075	U1076	G1077	U1078	G1079	A1080	A1081		
C962	G963	A964	U965	G966	C967	A968	A969	U970	C971	G972	C973	A974	A975	G976	A977	A978	C979	U980	U981	G982	A983	G984	C985	U986	G987	C988	G989	U989	C990	U991	U992	G993	C994	A995	C996	A997	U997	A998	C999	A1000	G1001	U1002	G1003	A1004	U1005	G1006	U1007	U1008	U1009	U1010	C1011	A1012	G1013	U1014	G1015	A1016	U1017	U1018	A1019	G1020	A1021
U843	G844	A845	U846	G847	U848	U849	U850	G851	U852	C853	U854	U855	C856	C857	U858	G859	A860	U861	C862	U863	A864	U865	C866	C867	C868	G869	U870	C871	U872	U873	U874	A875	C876	U877	U878	A879	C880	G881	U882	C883	U884	A885	C886	U887	U888	G889	U890	A891	U892	C893	U894	A895	C896	U897	G898	C899	A900	A901			
G902	G903	U904	U905	A906	U907	A908	A909	C910	U911	C912	U913	A914	U915	U916	G917	A918	U919	U920	U921	G922	A923	U924	G925	G926	C927	G928	G929	U930	C931	U932	C933	C934	A935	C936	A937	A938	C939	U940	G941	U942	U943	G944	G945	C946	G947	U948	A949	U950	G951	U952	C953	G954	U955	U956	A957	A958	U959	A960	U961		
A782	C783	A784	G785	U786	A787	U788	U789	A790	U791	A792	U793	A794	C795	C796	C797	U798	C799	U800	A801	A802	G803	U804	C805	C806	A807	C808	G809	U810	C811	U812	U813	C814	A815	U816	C817	U818	A819	U820	G821	U822	C823	G824	A825	C826	U827	U828	G829	U830	A831	C832	G833	U834	U835	U836	U837	G838	C839	A840	C841		
G722	U723	G724	A725	U726	G727	A728	A729	U730	G731	C732	U733	A734	C735	C736	U737	U738	C739	U740	C741	G742	A743	U744	G745	A746	A747	G748	A749	U750	C811	U751	U752	A753	C754	U755	C756	U757	C758	A759	G760	G761	U762	G763	C764	A765	A766	U767	U768	G769	C770	G771	U772	G773	G774	U775	U776	G777	U778	C779	A780	A781	

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	26670	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	3.844	Depositor
Minimum map value	-6.202	Depositor
Average map value	-3.839	Depositor
Map value standard deviation	0.520	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	3.49	5233/36831 (14.2%)	3.97	9457/57458 (16.5%)

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	984

The worst 5 of 5233 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	N	331	G	N7-C5	-21.91	1.26	1.39
1	N	77	A	N7-C5	-19.35	1.27	1.39
1	N	885	G	N7-C5	-19.01	1.27	1.39
1	N	406	G	C6-N1	18.40	1.52	1.39
1	N	560	A	C6-N6	17.58	1.48	1.33

The worst 5 of 9457 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	1299	A	N1-C6-N6	26.26	134.35	118.60
1	N	633	G	N1-C6-O6	25.68	135.31	119.90
1	N	1399	C	P-O3'-C3'	25.34	150.10	119.70
1	N	141	G	N1-C6-O6	24.86	134.81	119.90
1	N	207	C	C6-N1-C2	-24.71	110.42	120.30

There are no chirality outliers.

5 of 984 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	N	2	A	Sidechain
1	N	4	U	Sidechain
1	N	5	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	16524	547	0
All	All	32892	16554	16524	547	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 11.

The worst 5 of 547 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:67:C:H2'	1:N:68:G:C8	2.21	0.76
1:N:664:G:H22	1:N:741:G:H1	1.34	0.76
1:N:858:G:H1	1:N:869:G:H2'	1.50	0.75
1:N:507:C:H3'	1:N:508:U:H5''	1.70	0.74
1:N:840:C:H1'	1:N:843:U:H3	1.51	0.74

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%)	446 (29%)	148 (9%)

5 of 446 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 148 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	N	1191	A
1	N	1498	U
1	N	1228	C
1	N	1337	G
1	N	366	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.

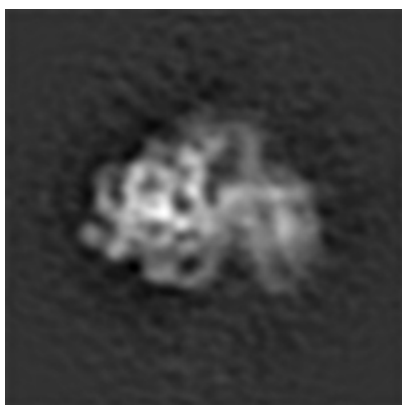
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-5501. These allow visual inspection of the internal detail of the map and identification of artifacts.

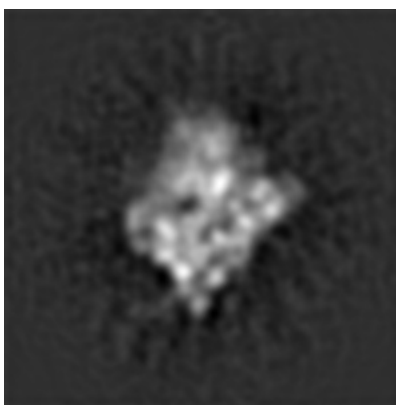
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

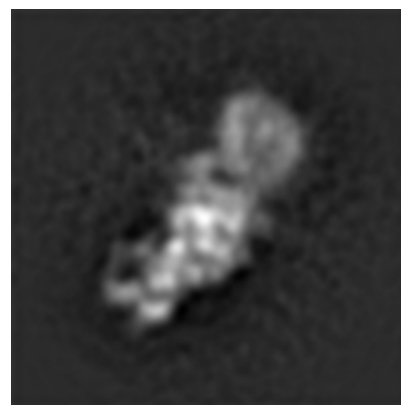
#### 6.1.1 Primary map



X



Y

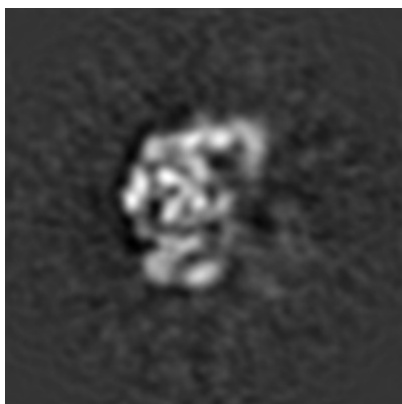


Z

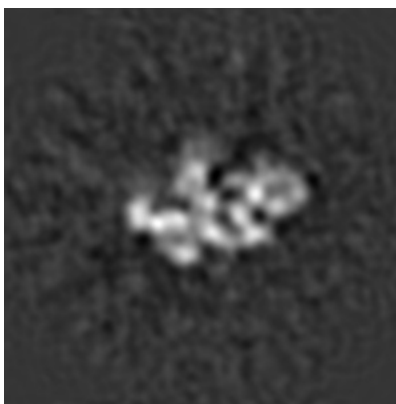
The images above show the map projected in three orthogonal directions.

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

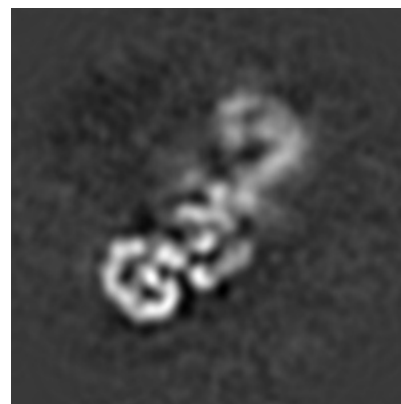
#### 6.2.1 Primary map



X Index: 62



Y Index: 62

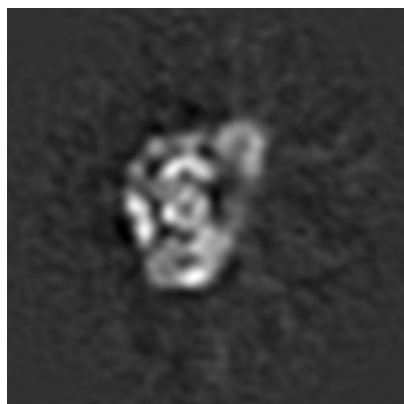


Z Index: 62

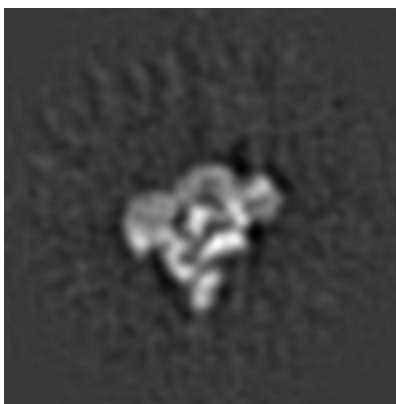
The images above show central slices of the map in three orthogonal directions.

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

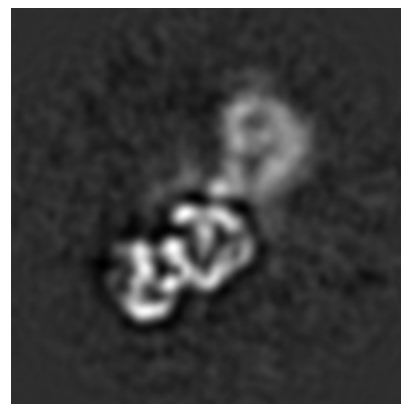
### 6.3.1 Primary map



X Index: 59



Y Index: 50

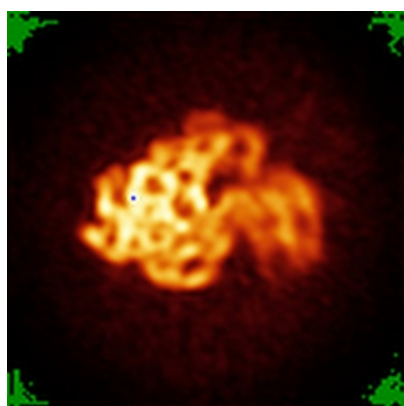


Z Index: 65

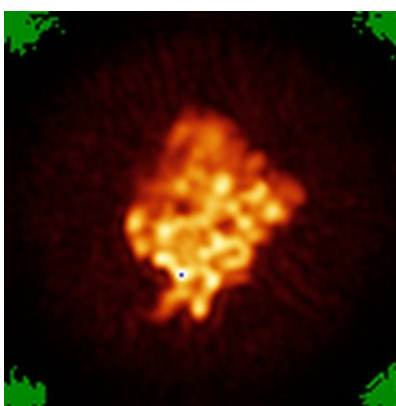
The images above show the largest variance slices of the map in three orthogonal directions.

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

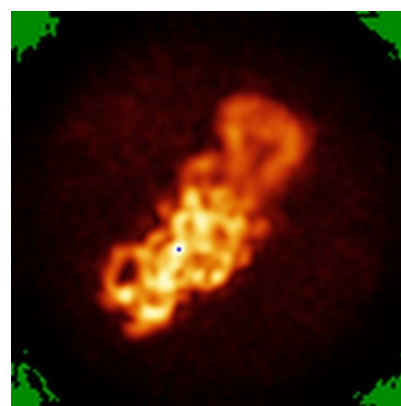
### 6.4.1 Primary map



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.

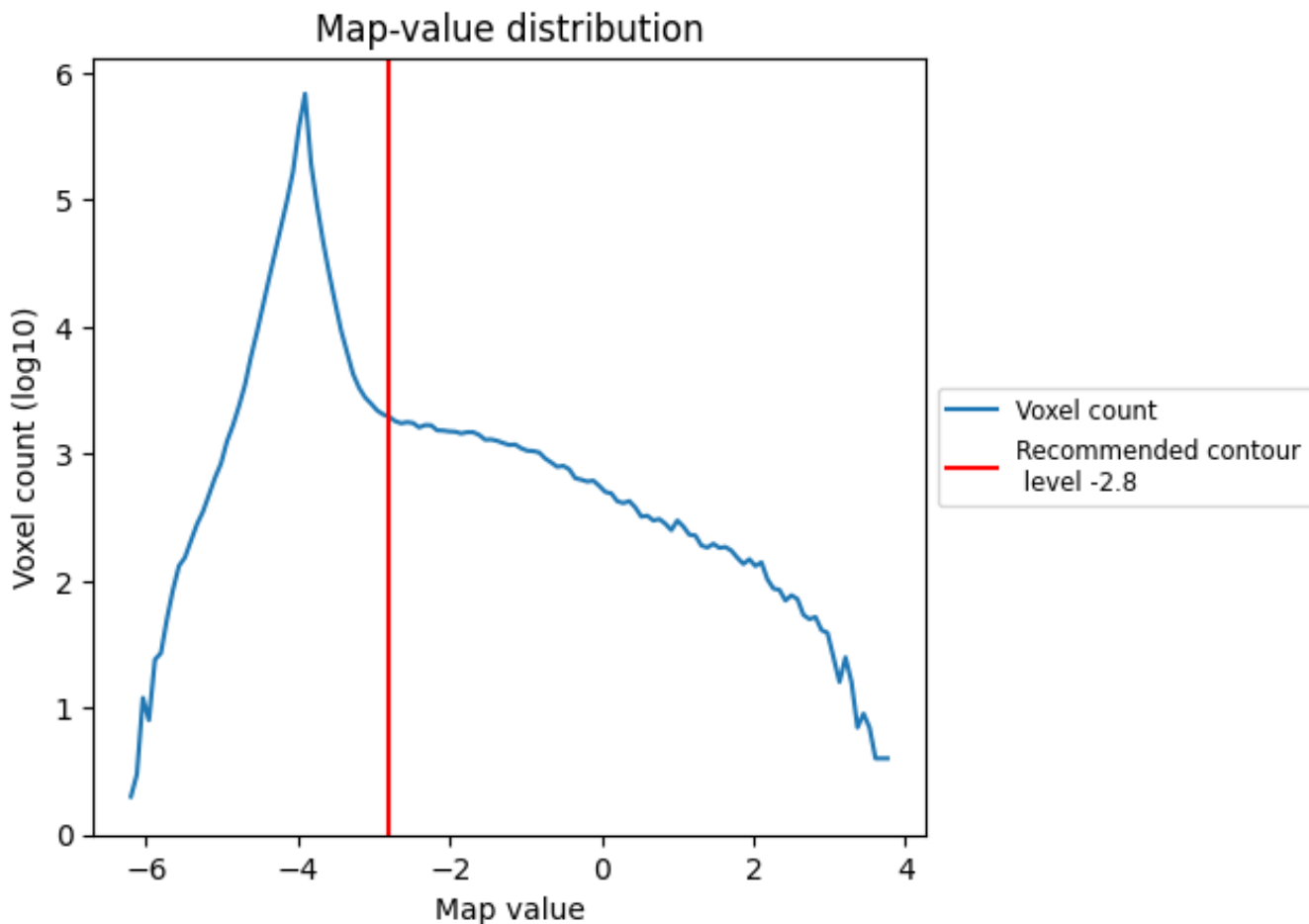
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

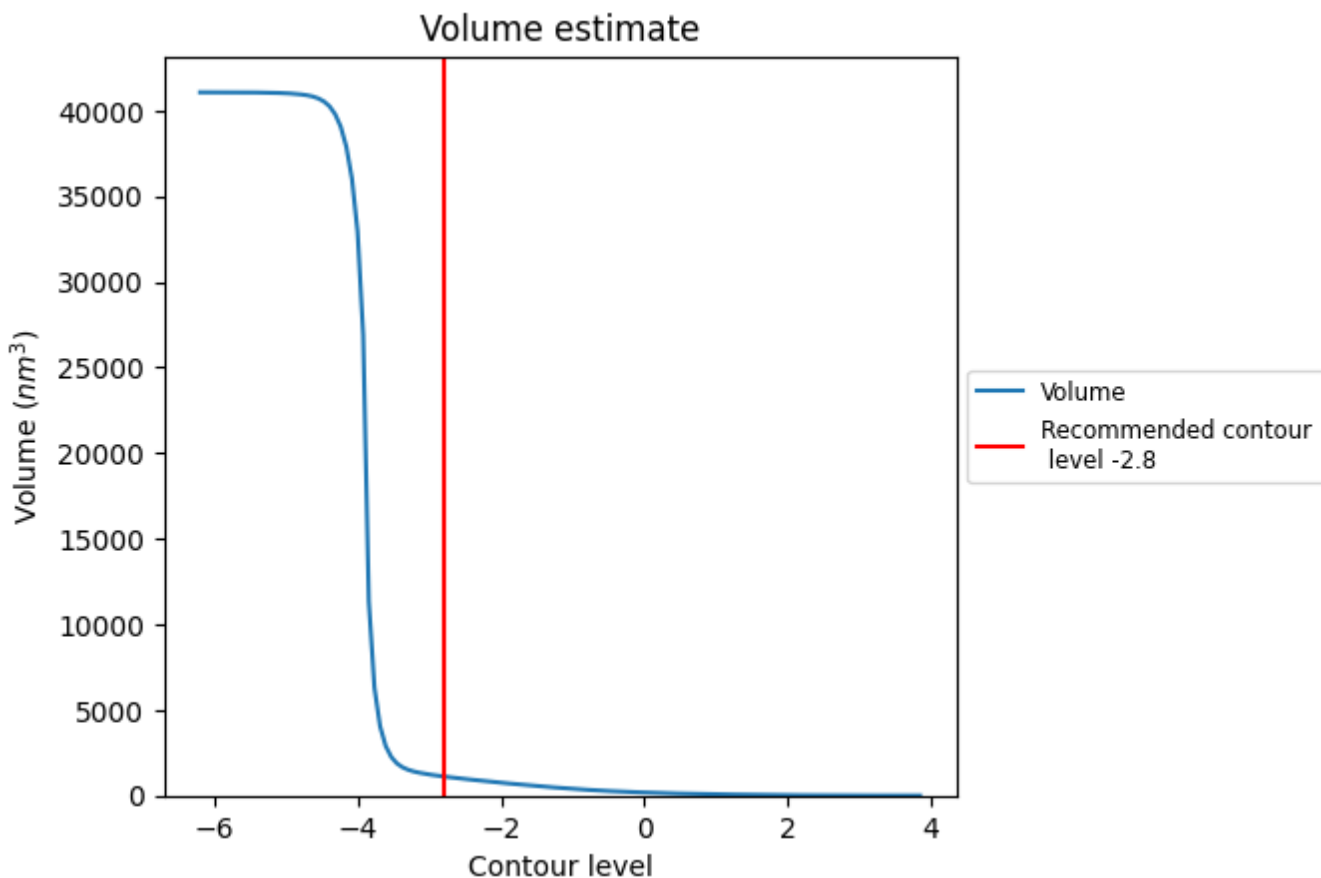
This section contains the results of statistical analysis of the map.

### 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.

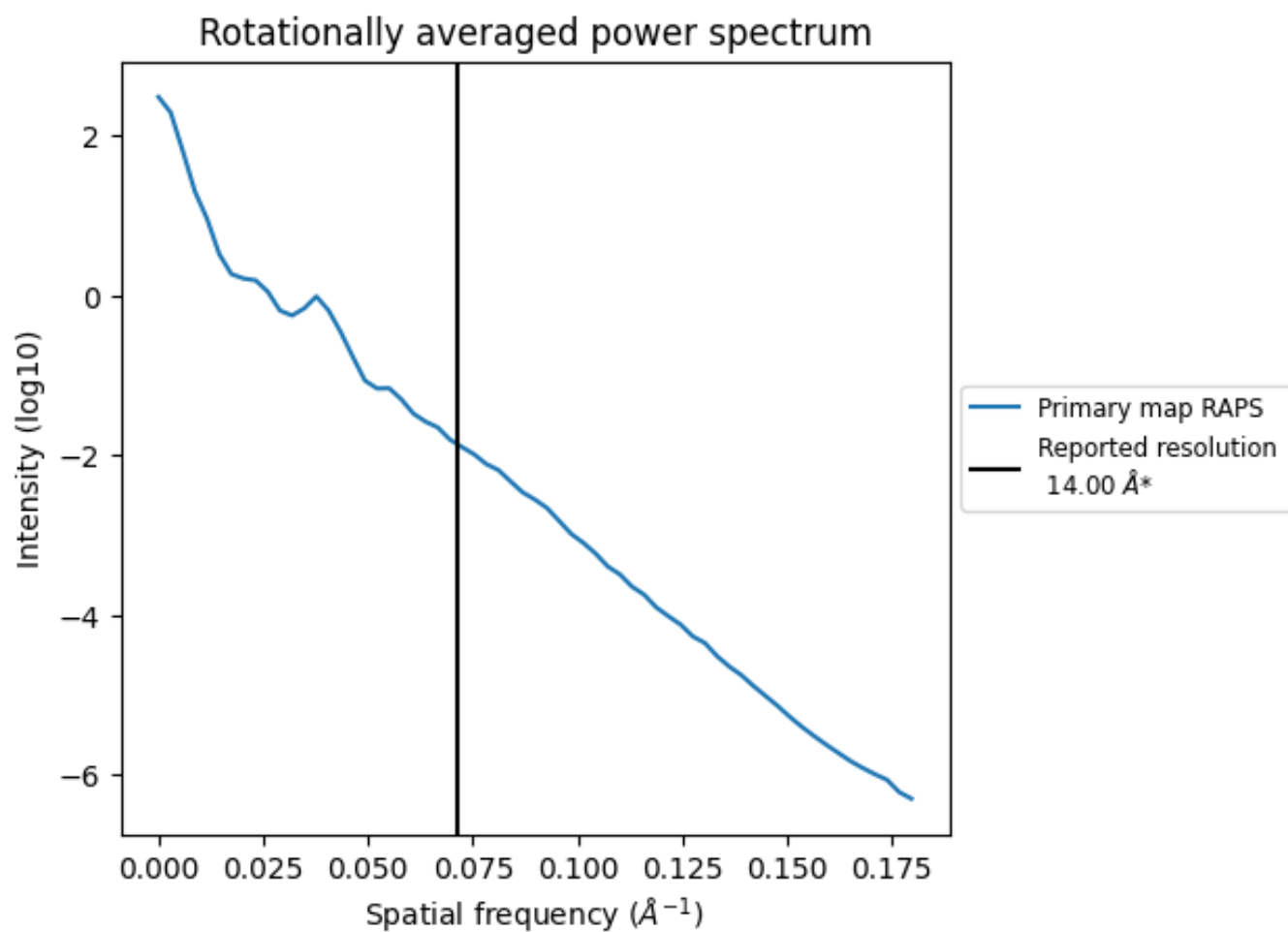
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1112 nm<sup>3</sup>; this corresponds to an approximate mass of 1005 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 0.071 Å<sup>-1</sup>



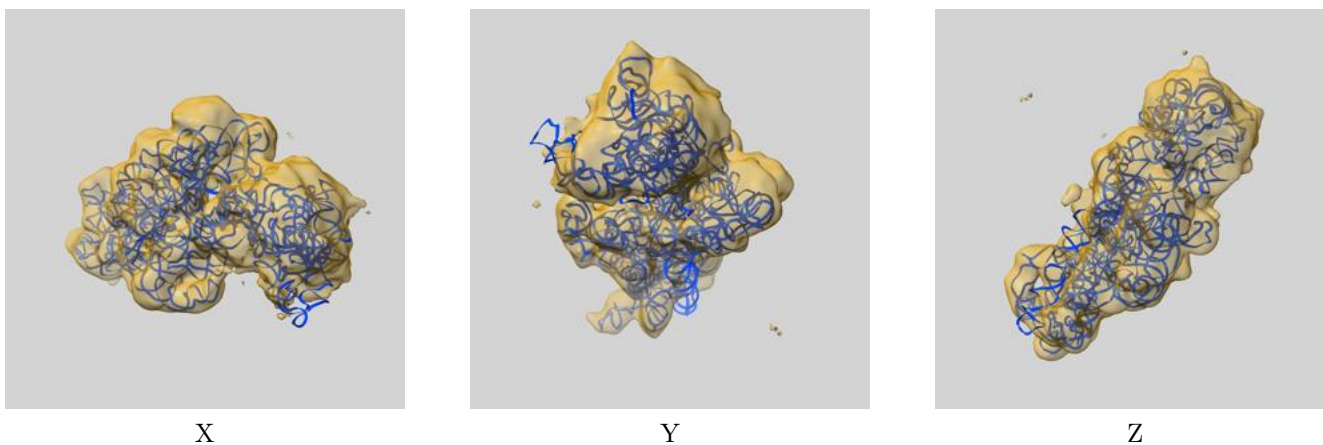
## 8 Fourier-Shell correlation

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

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

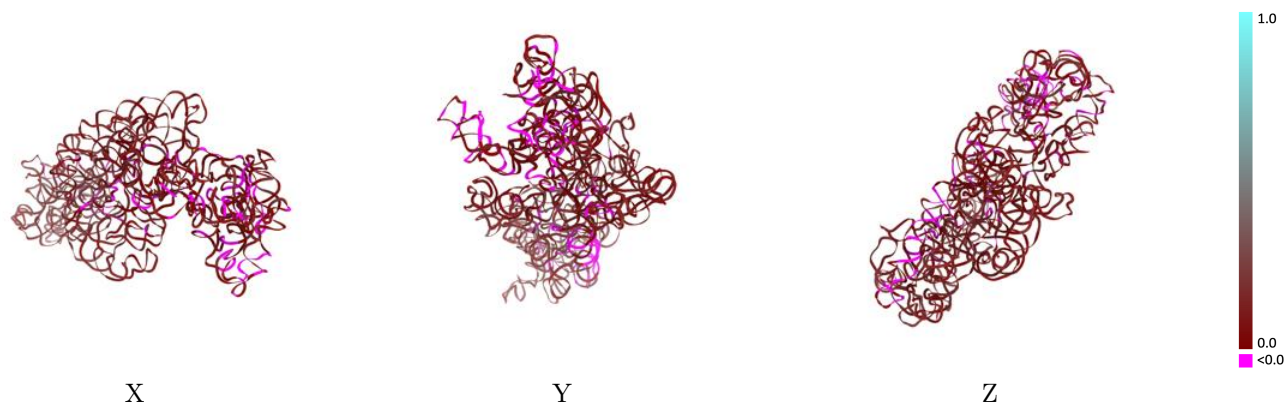
This section contains information regarding the fit between EMDB map EMD-5501 and PDB model 3J29. Per-residue inclusion information can be found in section 3 on page 4.

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



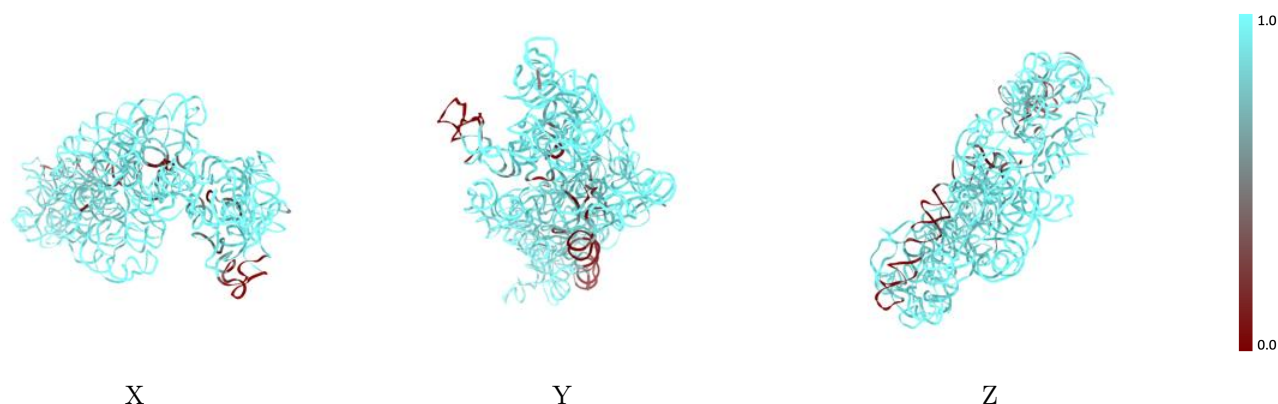
The images above show the 3D surface view of the map at the recommended contour level -2.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



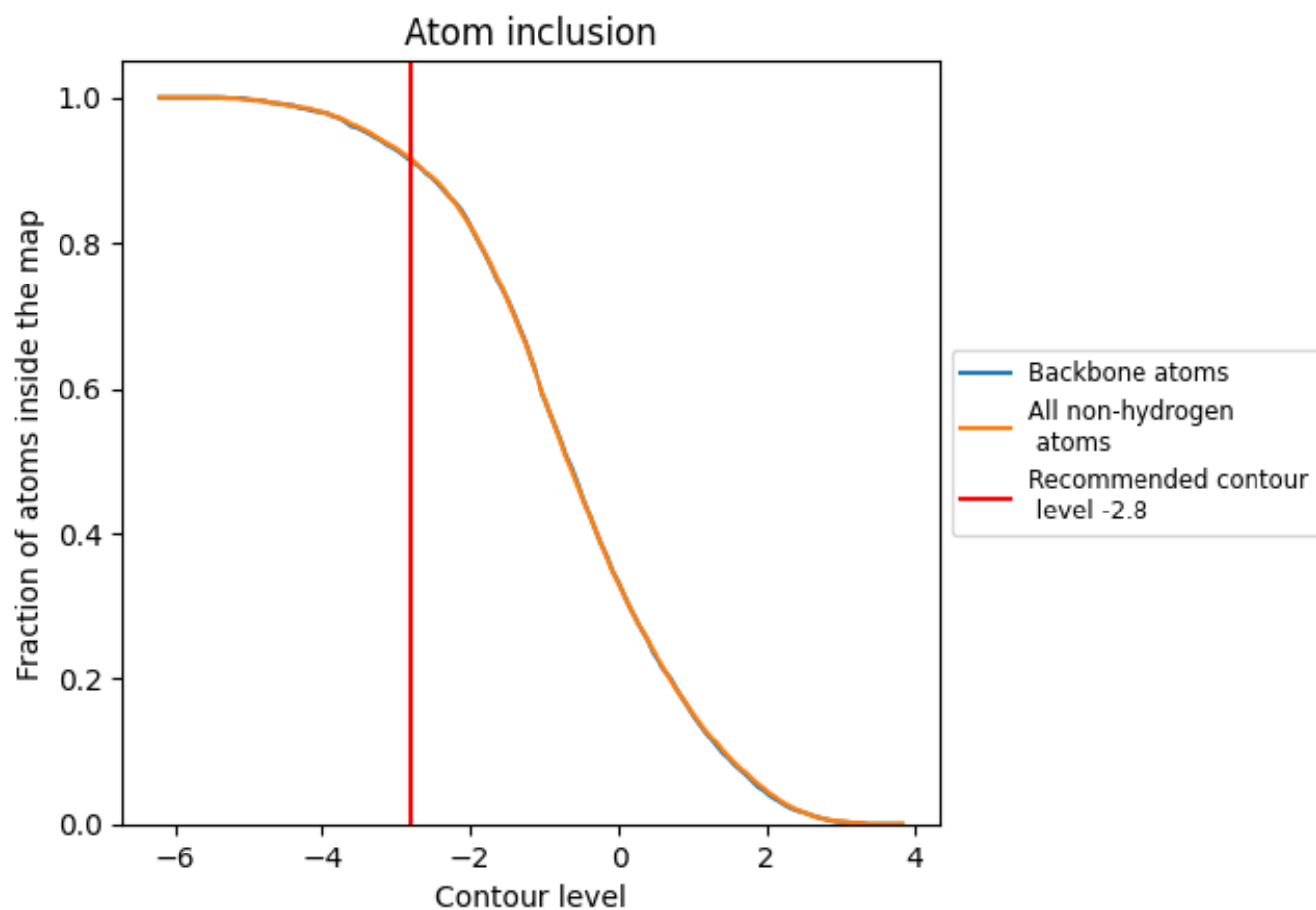
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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, 91% of all backbone atoms, 92% 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	 0.9160	 0.0890
N	 0.9160	 0.0890

