



## wwPDB EM Validation Summary Report ⓘ

Nov 10, 2024 – 09:45 am GMT

PDB ID : 6RMG  
EMDB ID : EMD-4936  
Title : Structure of PTCH1 bound to a modified Hedgehog ligand ShhN-C24II  
Authors : Korkhov, V.M.; Qi, C.  
Deposited on : 2019-05-06  
Resolution : 3.40 Å(reported)

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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.dev113  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
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

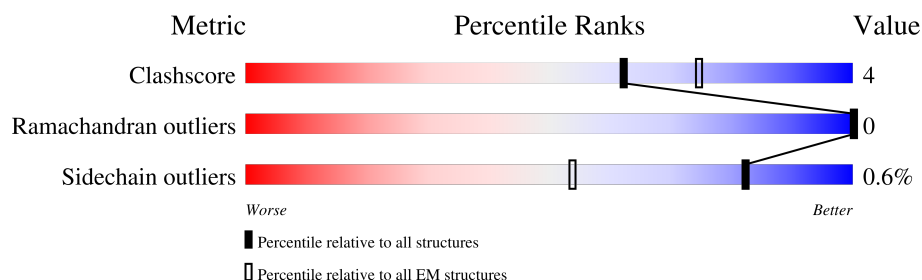
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
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  $\geq 3$ , 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	A	1471	<div> <div>8%</div> <div>62%</div> <div>7%</div> <div>30%</div> </div>
2	B	285	<div> <div>15%</div> <div>51%</div> <div>•</div> <div>47%</div> </div>
3	C	2	<div> <div>50%</div> <div>50%</div> </div>

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 19766 atoms, of which 9956 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Protein patched homolog 1, GFP-like fluorescent chromoprotein FP506, related.

Mol	Chain	Residues	Atoms						AltConf	Trace
1	A	1026	Total	C	H	N	O	S	0	0
			16284	5292	8163	1335	1449	45		

There are 46 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	645	ALA	TYR	conflict	UNP Q13635
A	1189	ALA	GLY	linker	UNP Q13635
A	1190	ALA	-	linker	UNP Q13635
A	1191	ALA	-	linker	UNP Q13635
A	1192	LEU	-	linker	UNP Q13635
A	1193	GLU	-	linker	UNP Q13635
A	1194	VAL	-	linker	UNP Q13635
A	1195	LEU	-	linker	UNP Q13635
A	1196	PHE	-	linker	UNP Q13635
A	1197	GLN	-	linker	UNP Q13635
A	1198	GLY	-	linker	UNP Q13635
A	1199	PRO	-	linker	UNP Q13635
A	1200	GLY	-	linker	UNP Q13635
A	1201	GLY	-	linker	UNP Q13635
A	1270	GLN	MET	conflict	UNP U6GSR1
A	1440	ALA	TRP	conflict	UNP U6GSR1
A	1442	SER	-	expression tag	UNP U6GSR1
A	1443	ALA	-	expression tag	UNP U6GSR1
A	1444	TRP	-	expression tag	UNP U6GSR1
A	1445	SER	-	expression tag	UNP U6GSR1
A	1446	HIS	-	expression tag	UNP U6GSR1
A	1447	PRO	-	expression tag	UNP U6GSR1
A	1448	GLN	-	expression tag	UNP U6GSR1
A	1449	PHE	-	expression tag	UNP U6GSR1
A	1450	GLU	-	expression tag	UNP U6GSR1
A	1451	LYS	-	expression tag	UNP U6GSR1
A	1452	GLY	-	expression tag	UNP U6GSR1

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1453	GLY	-	expression tag	UNP U6GSR1
A	1454	GLY	-	expression tag	UNP U6GSR1
A	1455	SER	-	expression tag	UNP U6GSR1
A	1456	GLY	-	expression tag	UNP U6GSR1
A	1457	GLY	-	expression tag	UNP U6GSR1
A	1458	GLY	-	expression tag	UNP U6GSR1
A	1459	SER	-	expression tag	UNP U6GSR1
A	1460	GLY	-	expression tag	UNP U6GSR1
A	1461	GLY	-	expression tag	UNP U6GSR1
A	1462	SER	-	expression tag	UNP U6GSR1
A	1463	ALA	-	expression tag	UNP U6GSR1
A	1464	TRP	-	expression tag	UNP U6GSR1
A	1465	SER	-	expression tag	UNP U6GSR1
A	1466	HIS	-	expression tag	UNP U6GSR1
A	1467	PRO	-	expression tag	UNP U6GSR1
A	1468	GLN	-	expression tag	UNP U6GSR1
A	1469	PHE	-	expression tag	UNP U6GSR1
A	1470	GLU	-	expression tag	UNP U6GSR1
A	1471	LYS	-	expression tag	UNP U6GSR1

- Molecule 2 is a protein called Sonic hedgehog protein.

Mol	Chain	Residues	Atoms						AltConf	Trace
2	B	150	Total	C	H	N	O	S	0	0
			2369	753	1164	214	233	5		

There are 111 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-87	MET	-	initiating methionine	UNP Q15465
B	-86	LYS	-	expression tag	UNP Q15465
B	-85	LYS	-	expression tag	UNP Q15465
B	-84	HIS	-	expression tag	UNP Q15465
B	-83	HIS	-	expression tag	UNP Q15465
B	-82	HIS	-	expression tag	UNP Q15465
B	-81	HIS	-	expression tag	UNP Q15465
B	-80	HIS	-	expression tag	UNP Q15465
B	-79	HIS	-	expression tag	UNP Q15465
B	-78	GLY	-	expression tag	UNP Q15465
B	-77	SER	-	expression tag	UNP Q15465
B	-76	GLY	-	expression tag	UNP Q15465
B	-75	MET	-	expression tag	UNP Q15465

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-74	SER	-	expression tag	UNP Q15465
B	-73	ASP	-	expression tag	UNP Q15465
B	-72	SER	-	expression tag	UNP Q15465
B	-71	GLU	-	expression tag	UNP Q15465
B	-70	VAL	-	expression tag	UNP Q15465
B	-69	ASN	-	expression tag	UNP Q15465
B	-68	GLN	-	expression tag	UNP Q15465
B	-67	GLU	-	expression tag	UNP Q15465
B	-66	ALA	-	expression tag	UNP Q15465
B	-65	LYS	-	expression tag	UNP Q15465
B	-64	PRO	-	expression tag	UNP Q15465
B	-63	GLU	-	expression tag	UNP Q15465
B	-62	VAL	-	expression tag	UNP Q15465
B	-61	LYS	-	expression tag	UNP Q15465
B	-60	PRO	-	expression tag	UNP Q15465
B	-59	GLU	-	expression tag	UNP Q15465
B	-58	VAL	-	expression tag	UNP Q15465
B	-57	LYS	-	expression tag	UNP Q15465
B	-56	PRO	-	expression tag	UNP Q15465
B	-55	GLU	-	expression tag	UNP Q15465
B	-54	THR	-	expression tag	UNP Q15465
B	-53	HIS	-	expression tag	UNP Q15465
B	-52	ILE	-	expression tag	UNP Q15465
B	-51	ASN	-	expression tag	UNP Q15465
B	-50	LEU	-	expression tag	UNP Q15465
B	-49	LYS	-	expression tag	UNP Q15465
B	-48	VAL	-	expression tag	UNP Q15465
B	-47	SER	-	expression tag	UNP Q15465
B	-46	ASP	-	expression tag	UNP Q15465
B	-45	GLY	-	expression tag	UNP Q15465
B	-44	SER	-	expression tag	UNP Q15465
B	-43	SER	-	expression tag	UNP Q15465
B	-42	GLU	-	expression tag	UNP Q15465
B	-41	ILE	-	expression tag	UNP Q15465
B	-40	PHE	-	expression tag	UNP Q15465
B	-39	PHE	-	expression tag	UNP Q15465
B	-38	LYS	-	expression tag	UNP Q15465
B	-37	ILE	-	expression tag	UNP Q15465
B	-36	LYS	-	expression tag	UNP Q15465
B	-35	LYS	-	expression tag	UNP Q15465
B	-34	THR	-	expression tag	UNP Q15465
B	-33	THR	-	expression tag	UNP Q15465

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-32	PRO	-	expression tag	UNP Q15465
B	-31	LEU	-	expression tag	UNP Q15465
B	-30	ARG	-	expression tag	UNP Q15465
B	-29	ARG	-	expression tag	UNP Q15465
B	-28	LEU	-	expression tag	UNP Q15465
B	-27	MET	-	expression tag	UNP Q15465
B	-26	GLU	-	expression tag	UNP Q15465
B	-25	ALA	-	expression tag	UNP Q15465
B	-24	PHE	-	expression tag	UNP Q15465
B	-23	ALA	-	expression tag	UNP Q15465
B	-22	LYS	-	expression tag	UNP Q15465
B	-21	ARG	-	expression tag	UNP Q15465
B	-20	GLN	-	expression tag	UNP Q15465
B	-19	GLY	-	expression tag	UNP Q15465
B	-18	LYS	-	expression tag	UNP Q15465
B	-17	GLU	-	expression tag	UNP Q15465
B	-16	MET	-	expression tag	UNP Q15465
B	-15	ASP	-	expression tag	UNP Q15465
B	-14	SER	-	expression tag	UNP Q15465
B	-13	LEU	-	expression tag	UNP Q15465
B	-12	ARG	-	expression tag	UNP Q15465
B	-11	PHE	-	expression tag	UNP Q15465
B	-10	LEU	-	expression tag	UNP Q15465
B	-9	TYR	-	expression tag	UNP Q15465
B	-8	ASP	-	expression tag	UNP Q15465
B	-7	GLY	-	expression tag	UNP Q15465
B	-6	ILE	-	expression tag	UNP Q15465
B	-5	ARG	-	expression tag	UNP Q15465
B	-4	ILE	-	expression tag	UNP Q15465
B	-3	GLN	-	expression tag	UNP Q15465
B	-2	ALA	-	expression tag	UNP Q15465
B	-1	ASP	-	expression tag	UNP Q15465
B	0	GLN	-	expression tag	UNP Q15465
B	1	THR	-	expression tag	UNP Q15465
B	2	PRO	-	expression tag	UNP Q15465
B	3	GLU	-	expression tag	UNP Q15465
B	4	ASP	-	expression tag	UNP Q15465
B	5	LEU	-	expression tag	UNP Q15465
B	6	ASP	-	expression tag	UNP Q15465
B	7	MET	-	expression tag	UNP Q15465
B	8	GLU	-	expression tag	UNP Q15465
B	9	ASP	-	expression tag	UNP Q15465

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Chain	Residue	Modelled	Actual	Comment	Reference
B	10	ASN	-	expression tag	UNP Q15465
B	11	ASP	-	expression tag	UNP Q15465
B	12	ILE	-	expression tag	UNP Q15465
B	13	ILE	-	expression tag	UNP Q15465
B	14	GLU	-	expression tag	UNP Q15465
B	15	ALA	-	expression tag	UNP Q15465
B	16	HIS	-	expression tag	UNP Q15465
B	17	ARG	-	expression tag	UNP Q15465
B	18	GLU	-	expression tag	UNP Q15465
B	19	GLN	-	expression tag	UNP Q15465
B	20	ILE	-	expression tag	UNP Q15465
B	22	GLY	LEU	conflict	UNP Q15465
B	23	ILE	ALA	conflict	UNP Q15465
B	24	ILE	CYS	conflict	UNP Q15465

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	2	Total	C	H	N	O	0	0
			53	16	25	2	10		

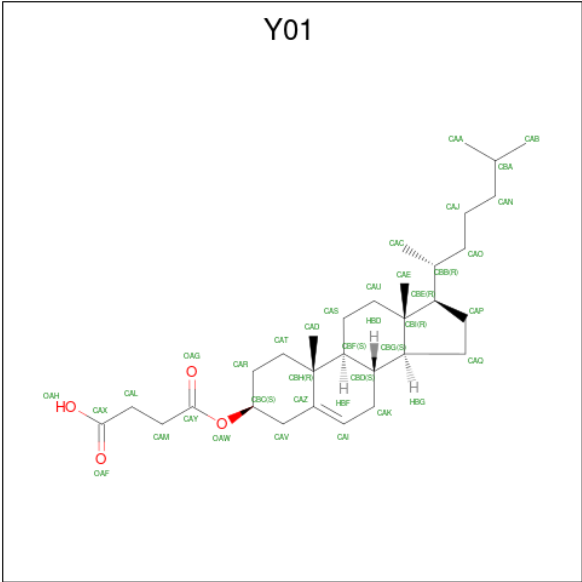
- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



Mol	Chain	Residues	Atoms					AltConf
4	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
4	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
4	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
4	A	1	Total	C	H	N	O	0
			27	8	13	1	5	
4	A	1	Total	C	H	N	O	0
			27	8	13	1	5	

- Molecule 5 is CHOLESTEROL HEMISUCCINATE (three-letter code: Y01) (formula:  $C_{31}H_{50}O_4$ ) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms				AltConf
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	
5	A	1	Total	C	H	O	0
			84	31	49	4	

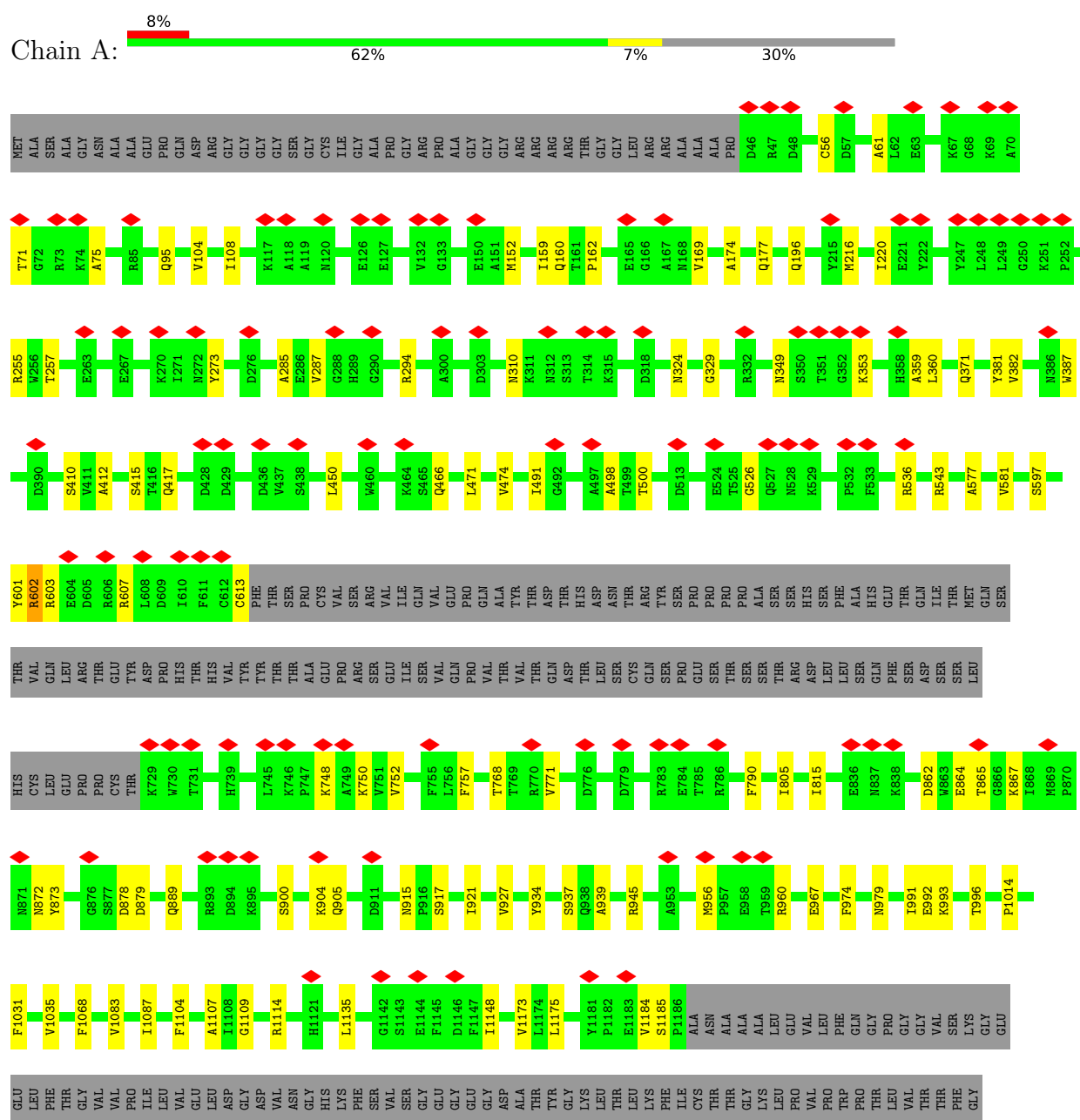
- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
6	B	1	Total	Zn	0
			1	1	

### 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: Protein patched homolog 1,GFP-like fluorescent chromoprotein FP506, related





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	200679	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 ( $e^-/\text{\AA}^2$ )	44.7	Depositor
Minimum defocus (nm)	-800	Depositor
Maximum defocus (nm)	-2400	Depositor
Magnification	Not provided	
Image detector	GATAN K2 QUANTUM (4k x 4k)	Depositor
Maximum map value	0.072	Depositor
Minimum map value	-0.033	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.016	Depositor
Map size (Å)	244.23001, 244.23001, 244.23001	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8141, 0.8141, 0.8141	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: Y01, NAG, ZN

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	0.34	0/8324	0.57	0/11319
2	B	0.29	0/1231	0.55	0/1661
All	All	0.33	0/9555	0.57	0/12980

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	75	ALA	Peptide
1	A	757	PHE	Peptide

### 5.2 Too-close contacts

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	8121	8163	8162	64	0
2	B	1205	1164	1164	4	0
3	C	28	25	25	0	0
4	A	70	65	65	2	0
5	A	385	539	539	12	0
6	B	1	0	0	0	0
All	All	9810	9956	9955	80	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 4.

The worst 5 of 80 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:466:GLN:OE1	1:A:603:ARG:NH2	2.12	0.80
1:A:152:MET:O	1:A:371:GLN:NE2	2.17	0.78
1:A:294:ARG:NH2	1:A:329:GLY:O	2.17	0.77
1:A:177:GLN:NE2	1:A:410:SER:O	2.22	0.73
4:A:1803:NAG:O7	4:A:1803:NAG:O4	2.04	0.72

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	1022/1471 (70%)	929 (91%)	93 (9%)	0	100	100
2	B	148/285 (52%)	139 (94%)	9 (6%)	0	100	100
All	All	1170/1756 (67%)	1068 (91%)	102 (9%)	0	100	100

There are no Ramachandran outliers to report.

### 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	872/1241 (70%)	866 (99%)	6 (1%)	81	88
2	B	128/243 (53%)	128 (100%)	0	100	100
All	All	1000/1484 (67%)	994 (99%)	6 (1%)	82	90

5 of 6 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	872	ASN
1	A	956	MET
1	A	979	ASN
1	A	324	ASN
1	A	310	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	872	ASN
1	A	905	GLN
1	A	929	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](#)

2 monosaccharides are modelled in this entry.

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	$\# Z  > 2$
3	NAG	C	1	3,1	14,14,15	0.32	0	17,19,21	0.39	0
3	NAG	C	2	3	14,14,15	0.14	0	17,19,21	0.75	1 (5%)

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
3	NAG	C	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
3	C	2	NAG	C2-N2-C7	2.35	126.25	122.90

There are no chirality outliers.

All (2) torsion outliers are listed below:

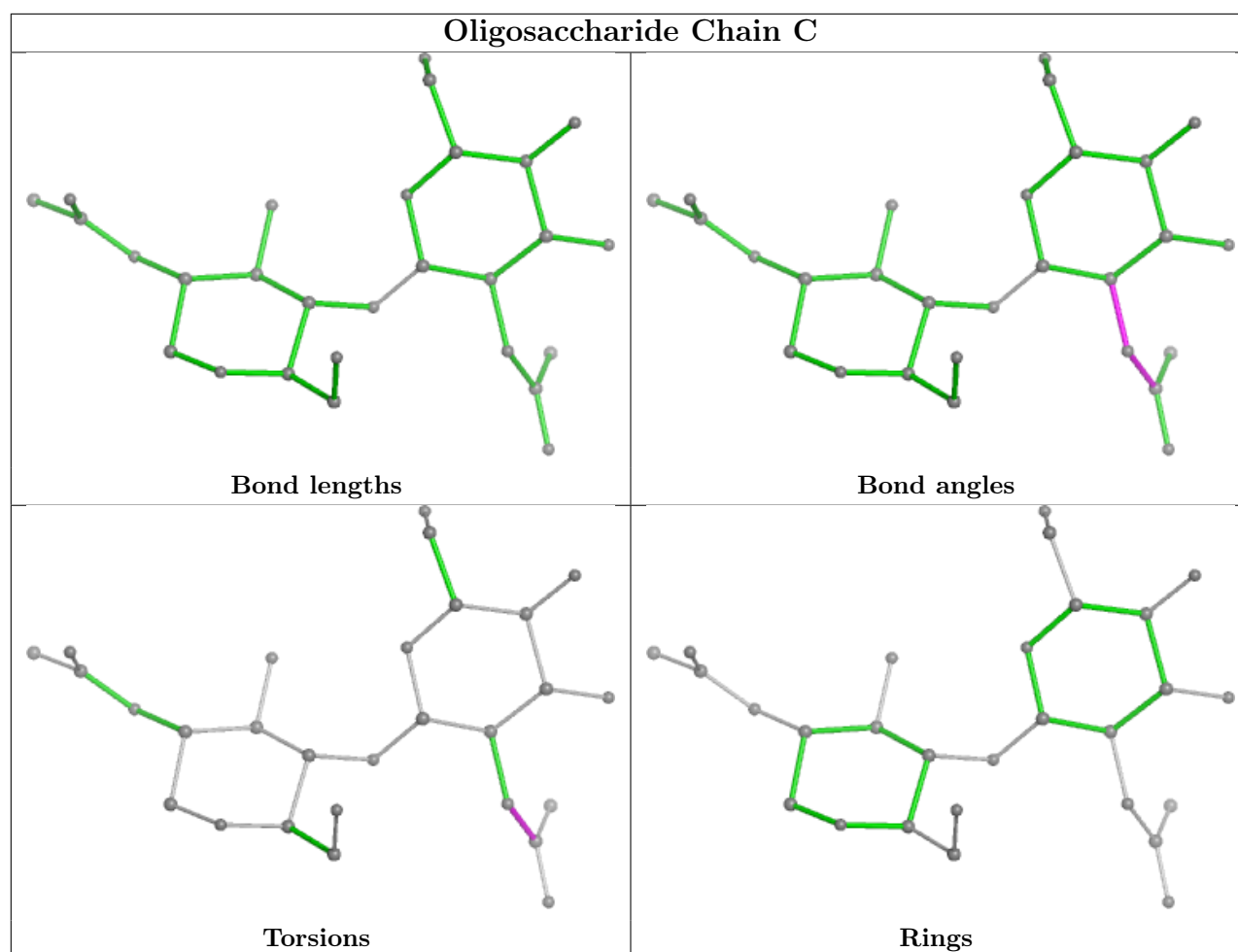
Mol	Chain	Res	Type	Atoms
3	C	2	NAG	C8-C7-N2-C2
3	C	2	NAG	O7-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.





## 5.6 Ligand geometry [i](#)

Of 17 ligands modelled in this entry, 1 is monoatomic - leaving 16 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
4	NAG	A	1804	1	14,14,15	0.19	0	17,19,21	0.41	0
5	Y01	A	1810	-	38,38,38	1.86	8 (21%)	57,57,57	3.10	25 (43%)
5	Y01	A	1816	-	38,38,38	2.25	9 (23%)	57,57,57	3.42	30 (52%)
5	Y01	A	1811	-	38,38,38	2.13	8 (21%)	57,57,57	3.26	28 (49%)
5	Y01	A	1809	-	38,38,38	2.14	10 (26%)	57,57,57	3.14	26 (45%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	Y01	A	1812	-	38,38,38	2.13	9 (23%)	57,57,57	3.04	27 (47%)
5	Y01	A	1815	-	38,38,38	2.11	8 (21%)	57,57,57	3.08	26 (45%)
4	NAG	A	1803	1	14,14,15	0.62	1 (7%)	17,19,21	0.59	0
4	NAG	A	1801	1	14,14,15	0.35	0	17,19,21	1.34	2 (11%)
5	Y01	A	1808	-	38,38,38	1.97	9 (23%)	57,57,57	3.07	25 (43%)
4	NAG	A	1807	1	14,14,15	0.20	0	17,19,21	0.46	0
5	Y01	A	1813	-	38,38,38	2.13	8 (21%)	57,57,57	3.26	27 (47%)
5	Y01	A	1814	-	38,38,38	2.17	9 (23%)	57,57,57	3.30	28 (49%)
5	Y01	A	1817	-	38,38,38	2.34	9 (23%)	57,57,57	3.31	29 (50%)
5	Y01	A	1818	-	38,38,38	1.96	11 (28%)	57,57,57	3.10	27 (47%)
4	NAG	A	1802	1	14,14,15	0.18	0	17,19,21	0.37	0

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
4	NAG	A	1804	1	-	2/6/23/26	0/1/1/1
5	Y01	A	1810	-	-	7/19/77/77	0/4/4/4
5	Y01	A	1816	-	-	13/19/77/77	0/4/4/4
5	Y01	A	1811	-	-	10/19/77/77	0/4/4/4
5	Y01	A	1809	-	-	6/19/77/77	0/4/4/4
5	Y01	A	1812	-	-	5/19/77/77	0/4/4/4
5	Y01	A	1815	-	-	6/19/77/77	0/4/4/4
4	NAG	A	1803	1	-	1/6/23/26	0/1/1/1
4	NAG	A	1801	1	-	3/6/23/26	0/1/1/1
5	Y01	A	1808	-	-	7/19/77/77	0/4/4/4
4	NAG	A	1807	1	-	1/6/23/26	0/1/1/1
5	Y01	A	1813	-	-	9/19/77/77	0/4/4/4
5	Y01	A	1814	-	-	10/19/77/77	0/4/4/4
5	Y01	A	1817	-	-	13/19/77/77	0/4/4/4
5	Y01	A	1818	-	-	4/19/77/77	0/4/4/4
4	NAG	A	1802	1	-	2/6/23/26	0/1/1/1

The worst 5 of 99 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1814	Y01	CAE-CBI	7.66	1.67	1.54
5	A	1813	Y01	CAE-CBI	7.30	1.67	1.54
5	A	1817	Y01	CAE-CBI	7.16	1.66	1.54
5	A	1811	Y01	CAE-CBI	7.12	1.66	1.54
5	A	1809	Y01	CAE-CBI	6.48	1.65	1.54

The worst 5 of 300 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1817	Y01	CBC-CAV-CAZ	10.11	127.22	111.52
5	A	1816	Y01	CBC-CAV-CAZ	9.01	125.52	111.52
5	A	1811	Y01	CBG-CBI-CBE	-8.33	90.20	100.07
5	A	1815	Y01	CBC-CAV-CAZ	8.22	124.28	111.52
5	A	1814	Y01	CBG-CBI-CBE	-8.15	90.42	100.07

There are no chirality outliers.

5 of 99 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1812	Y01	CAV-CBC-OAW-CAY
5	A	1812	Y01	OAG-CAY-OAW-CBC
5	A	1812	Y01	CAM-CAY-OAW-CBC
5	A	1813	Y01	OAG-CAY-OAW-CBC
5	A	1813	Y01	CAM-CAY-OAW-CBC

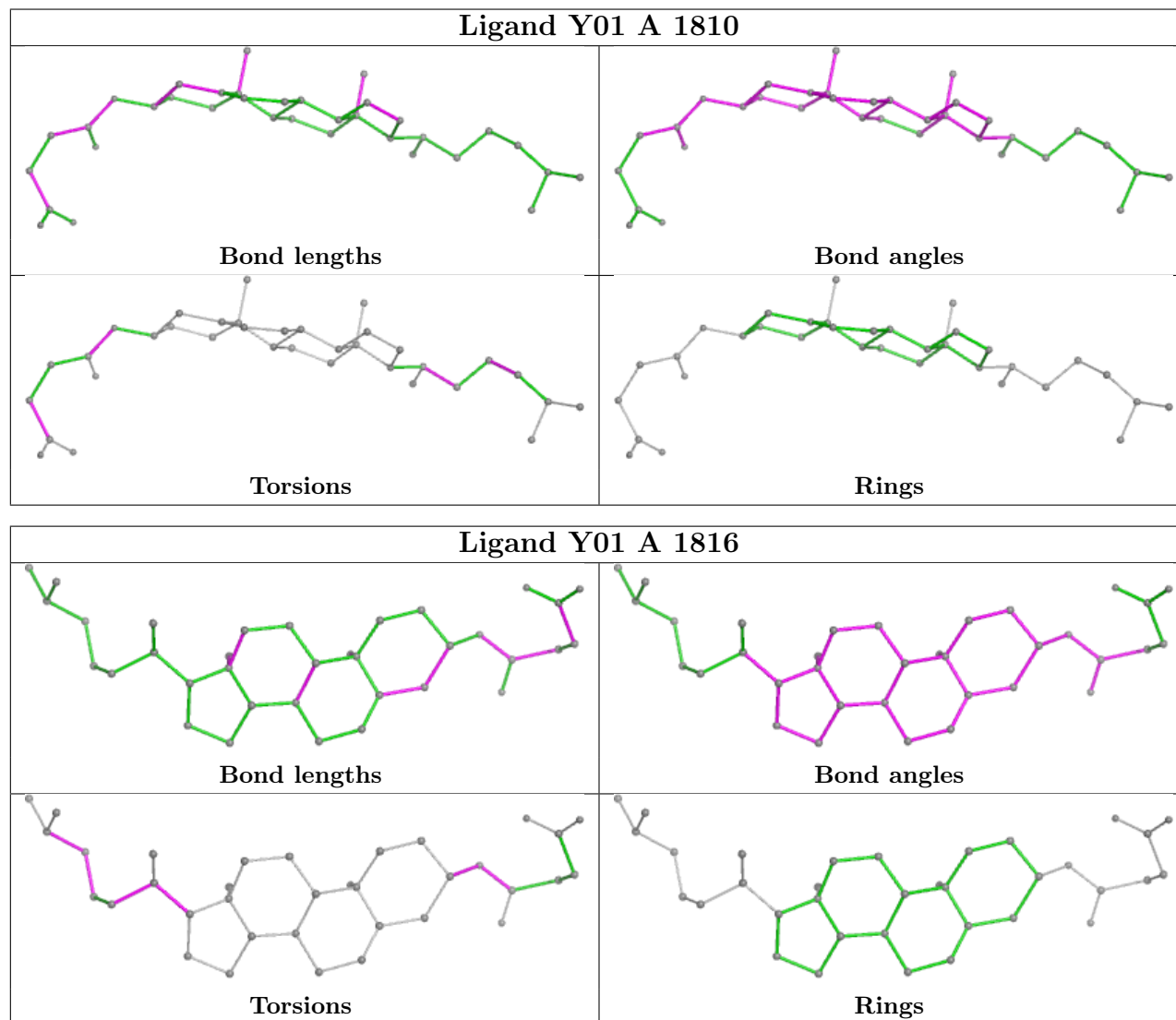
There are no ring outliers.

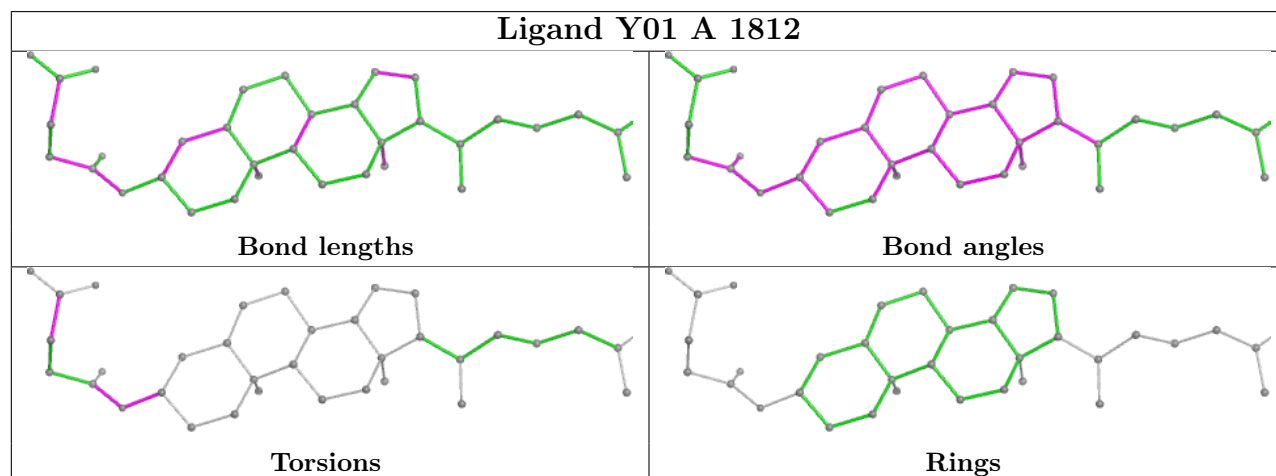
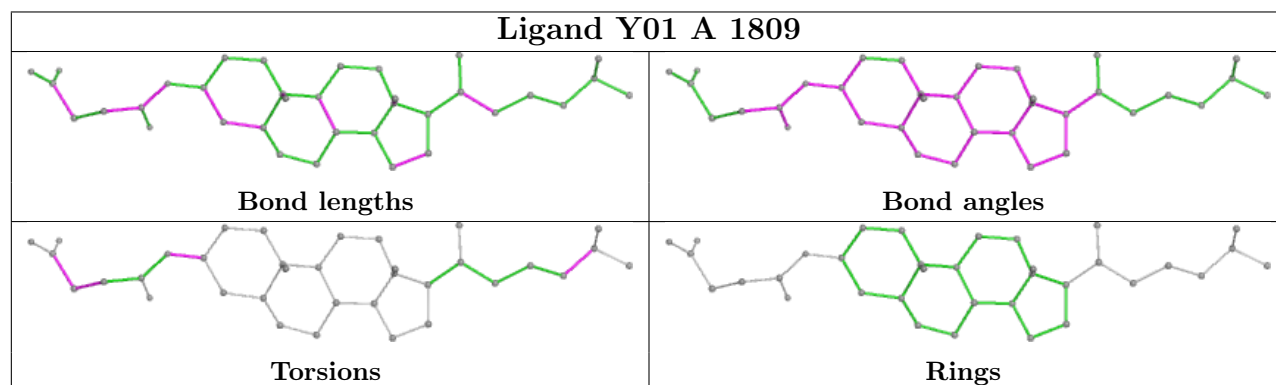
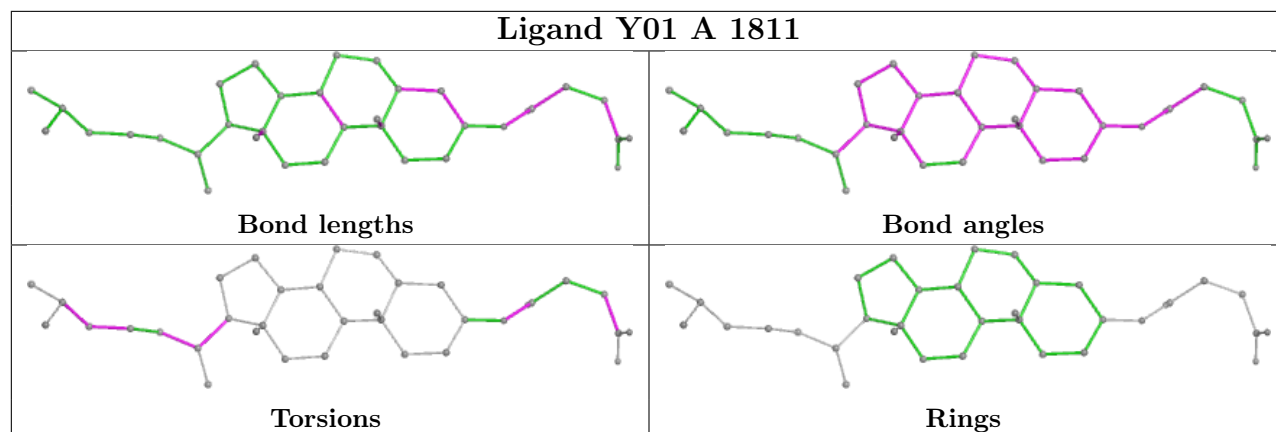
10 monomers are involved in 14 short contacts:

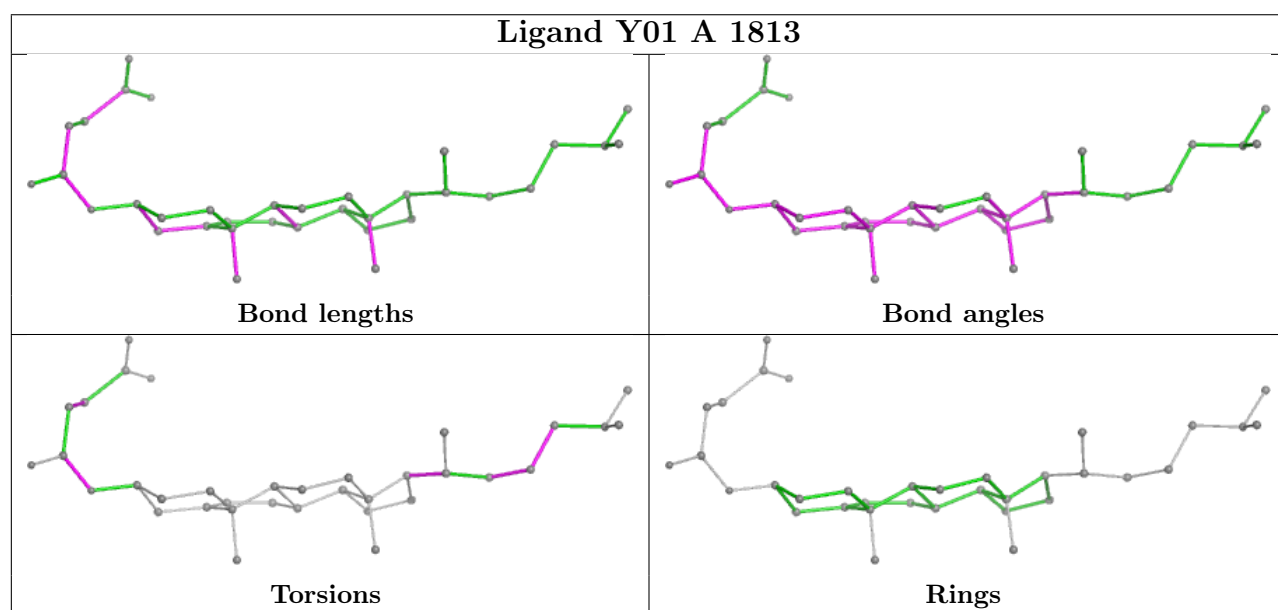
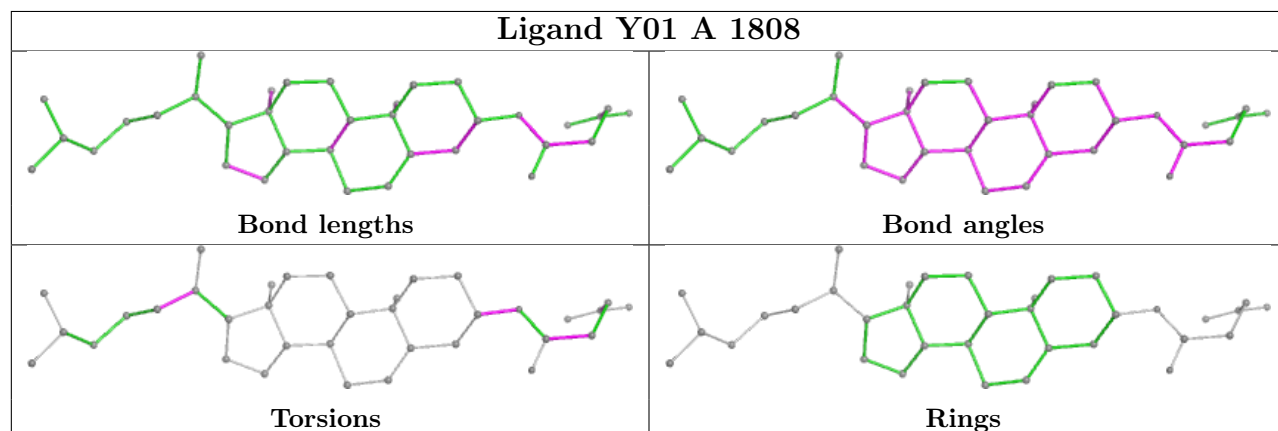
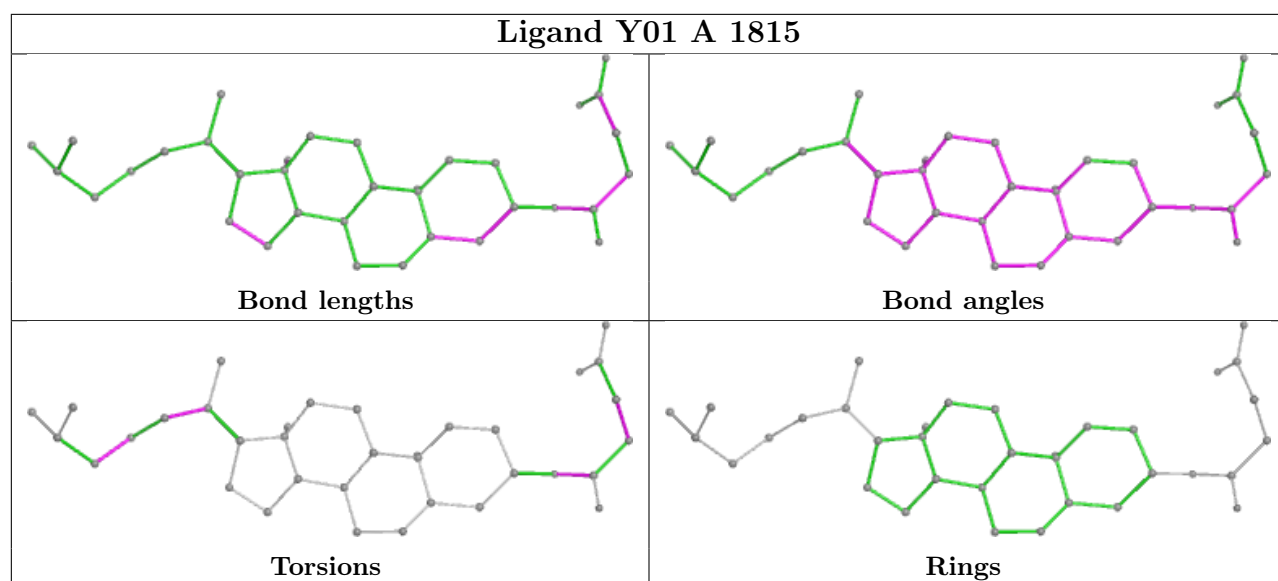
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1810	Y01	2	0
5	A	1816	Y01	1	0
5	A	1811	Y01	1	0
5	A	1809	Y01	2	0
5	A	1812	Y01	1	0
5	A	1815	Y01	1	0
4	A	1803	NAG	1	0
4	A	1801	NAG	1	0
5	A	1808	Y01	1	0
5	A	1818	Y01	3	0

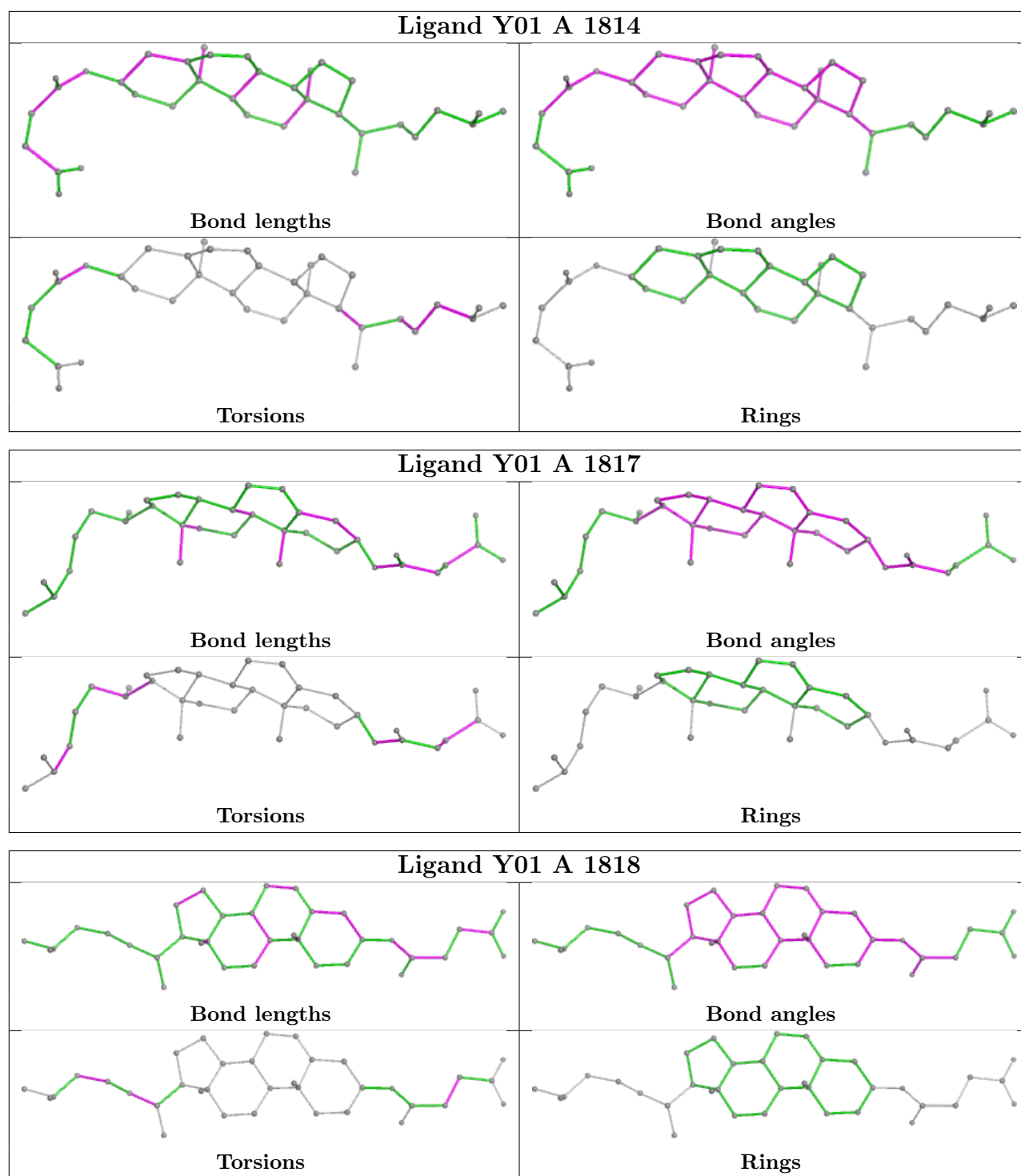
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 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.









## 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.



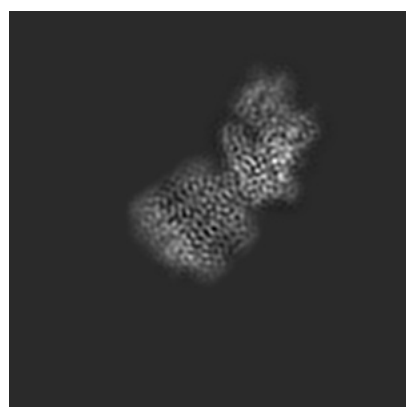
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4936. These allow visual inspection of the internal detail of the map and identification of artifacts.

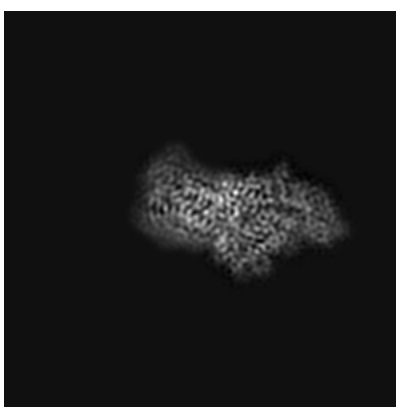
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

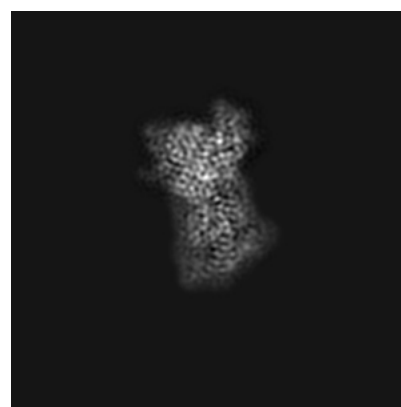
#### 6.1.1 Primary map



X



Y

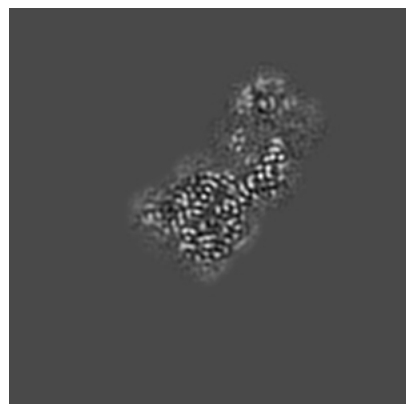


Z

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

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

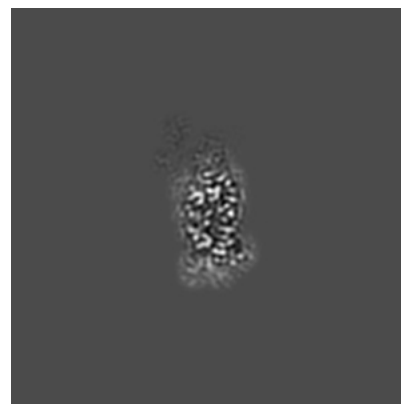
#### 6.2.1 Primary map



X Index: 150



Y Index: 150

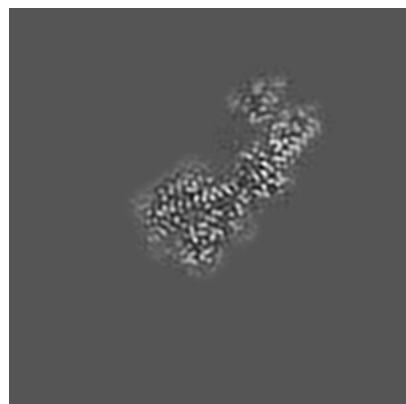


Z Index: 150

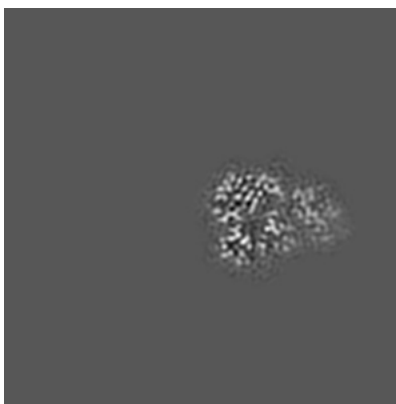
The images above show central slices of the map in three orthogonal directions.

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

### 6.3.1 Primary map



X Index: 157



Y Index: 192

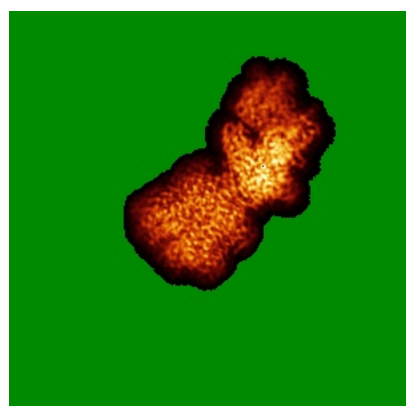


Z Index: 173

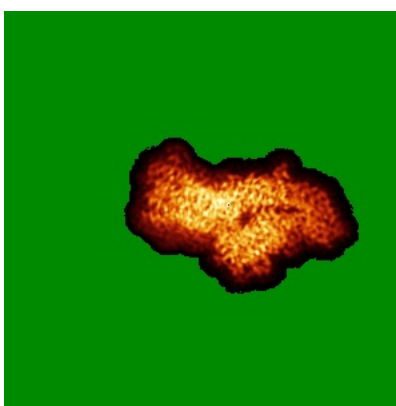
The images above show the largest variance slices of the map in three orthogonal directions.

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

### 6.4.1 Primary map



X



Y

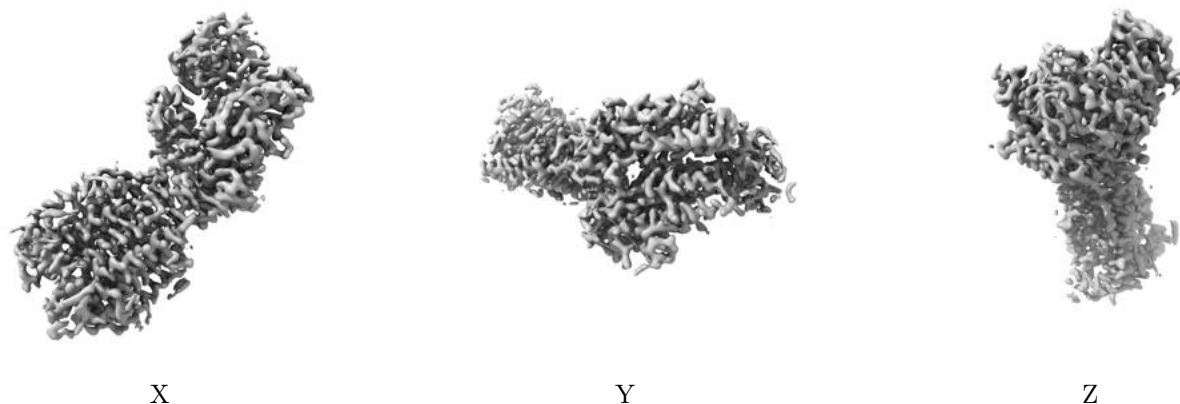


Z

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 0.016. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

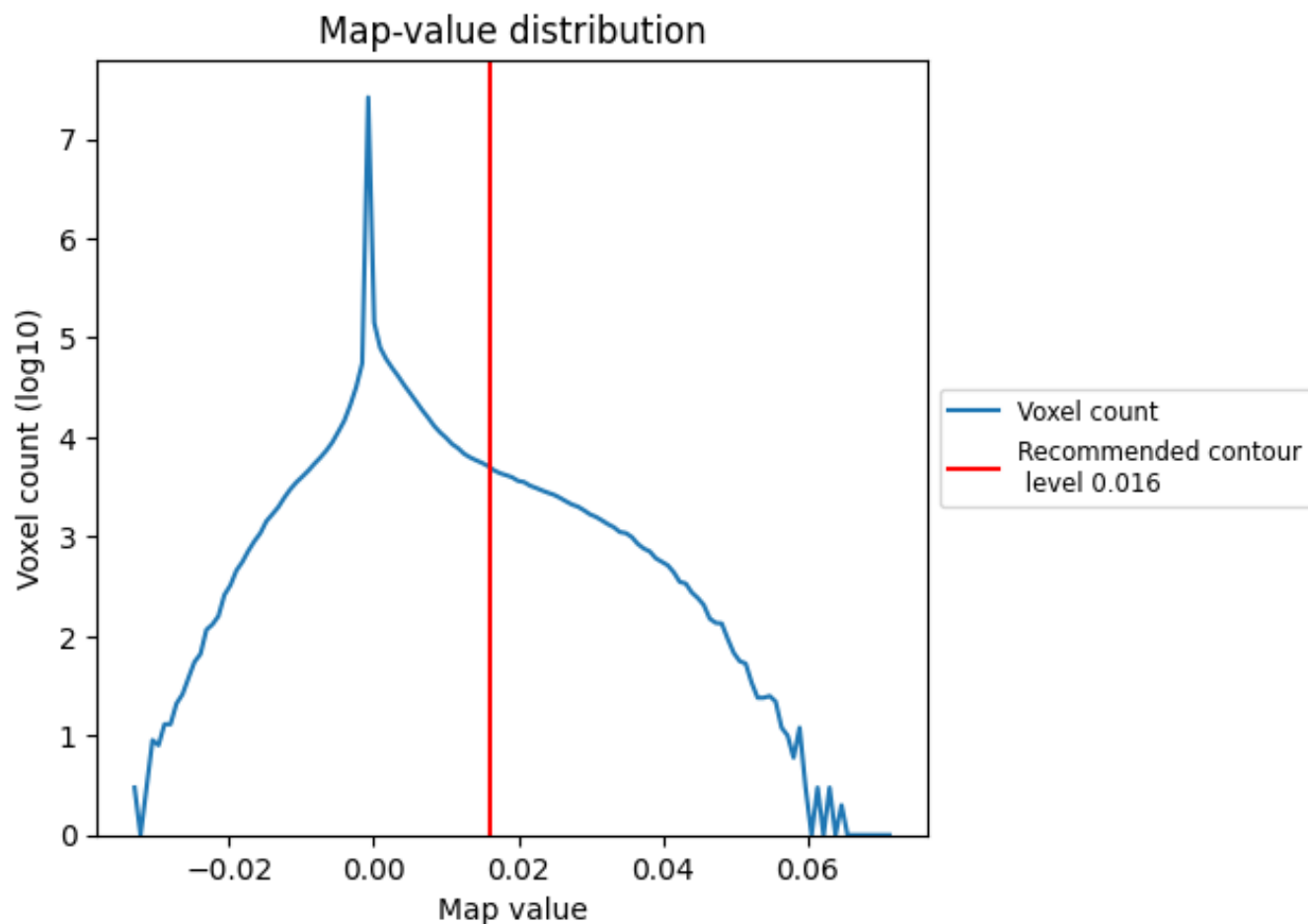
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

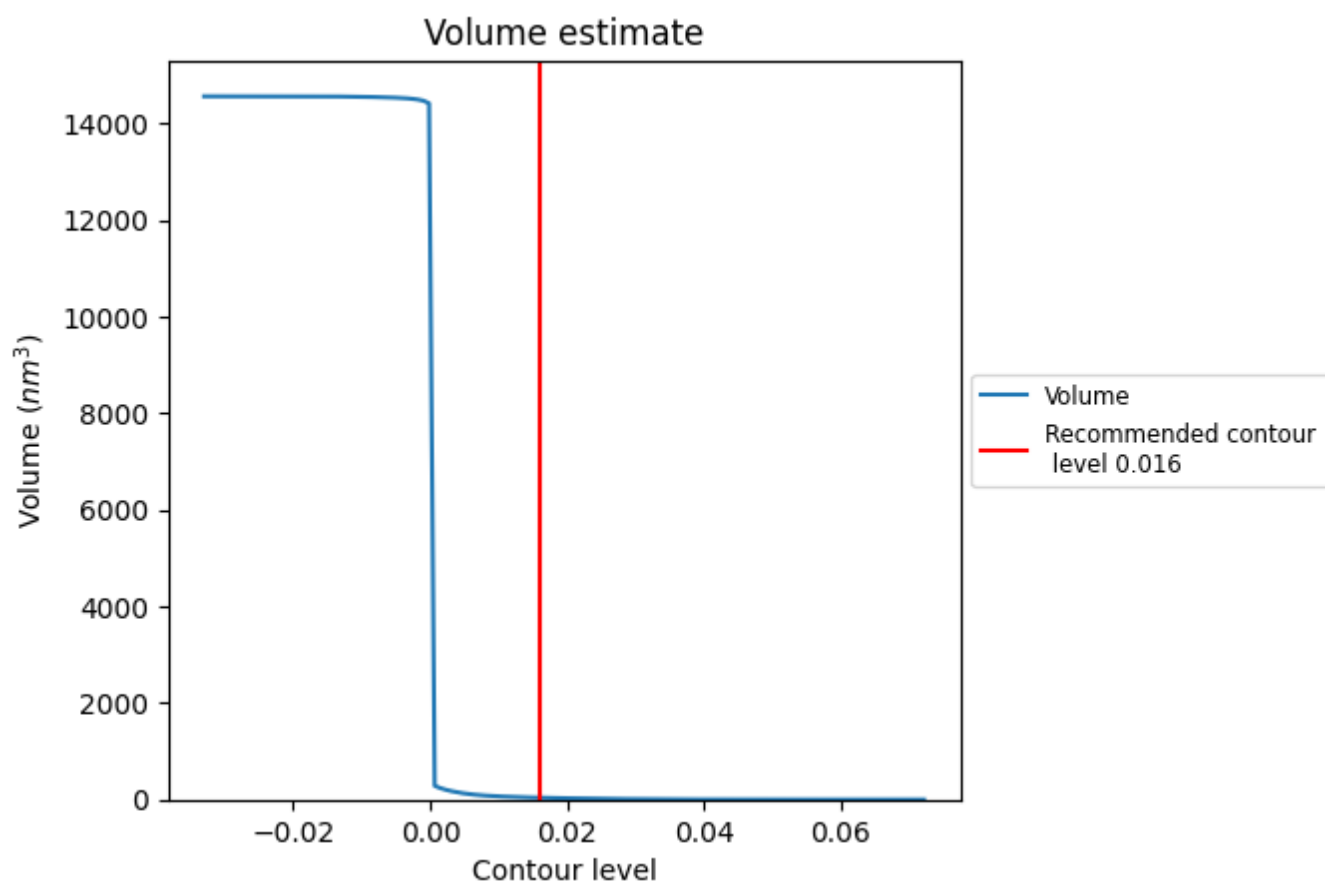
This section contains the results of statistical analysis of the map.

### 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.

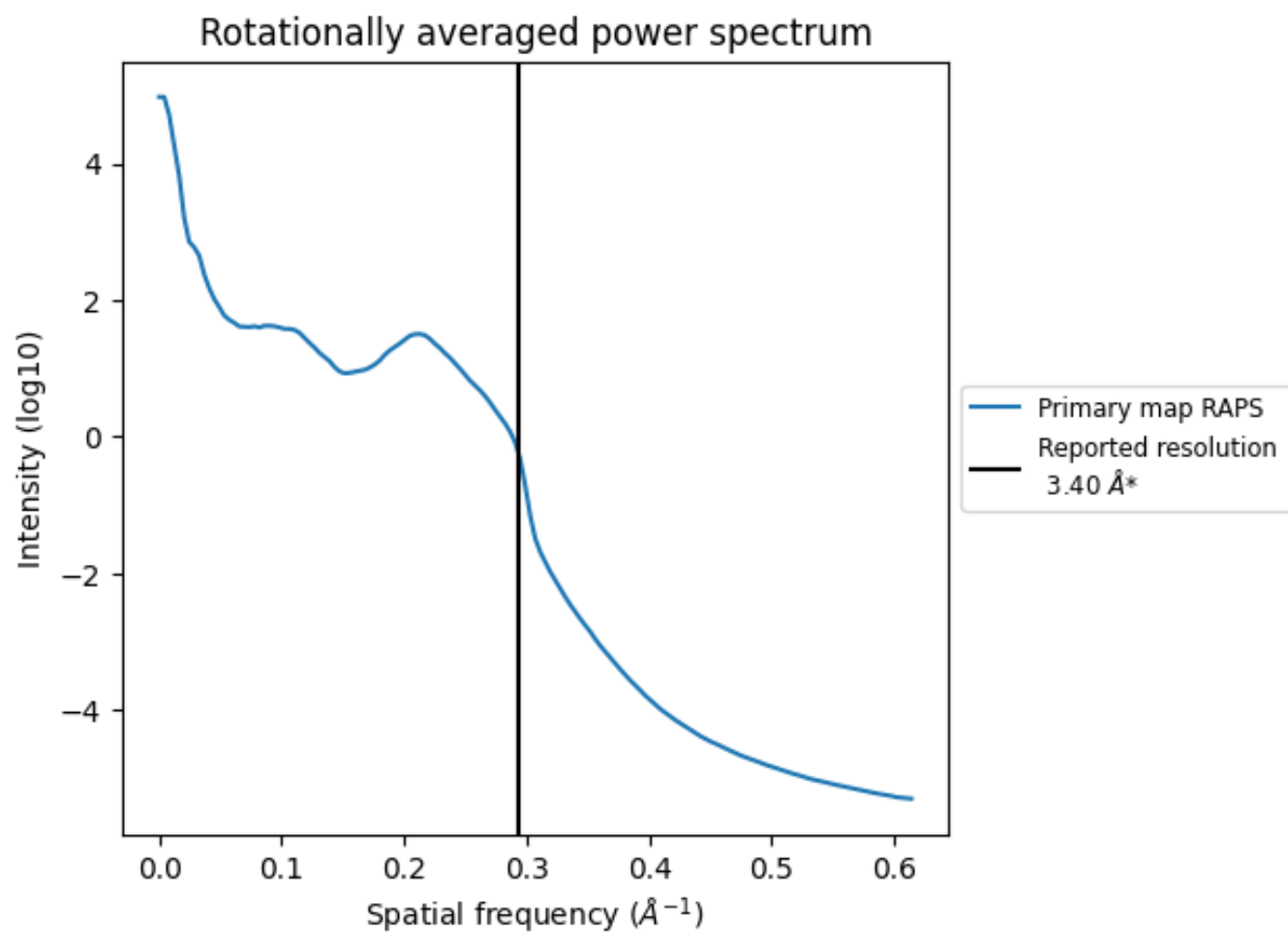
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 38 nm<sup>3</sup>; this corresponds to an approximate mass of 35 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum ⓘ

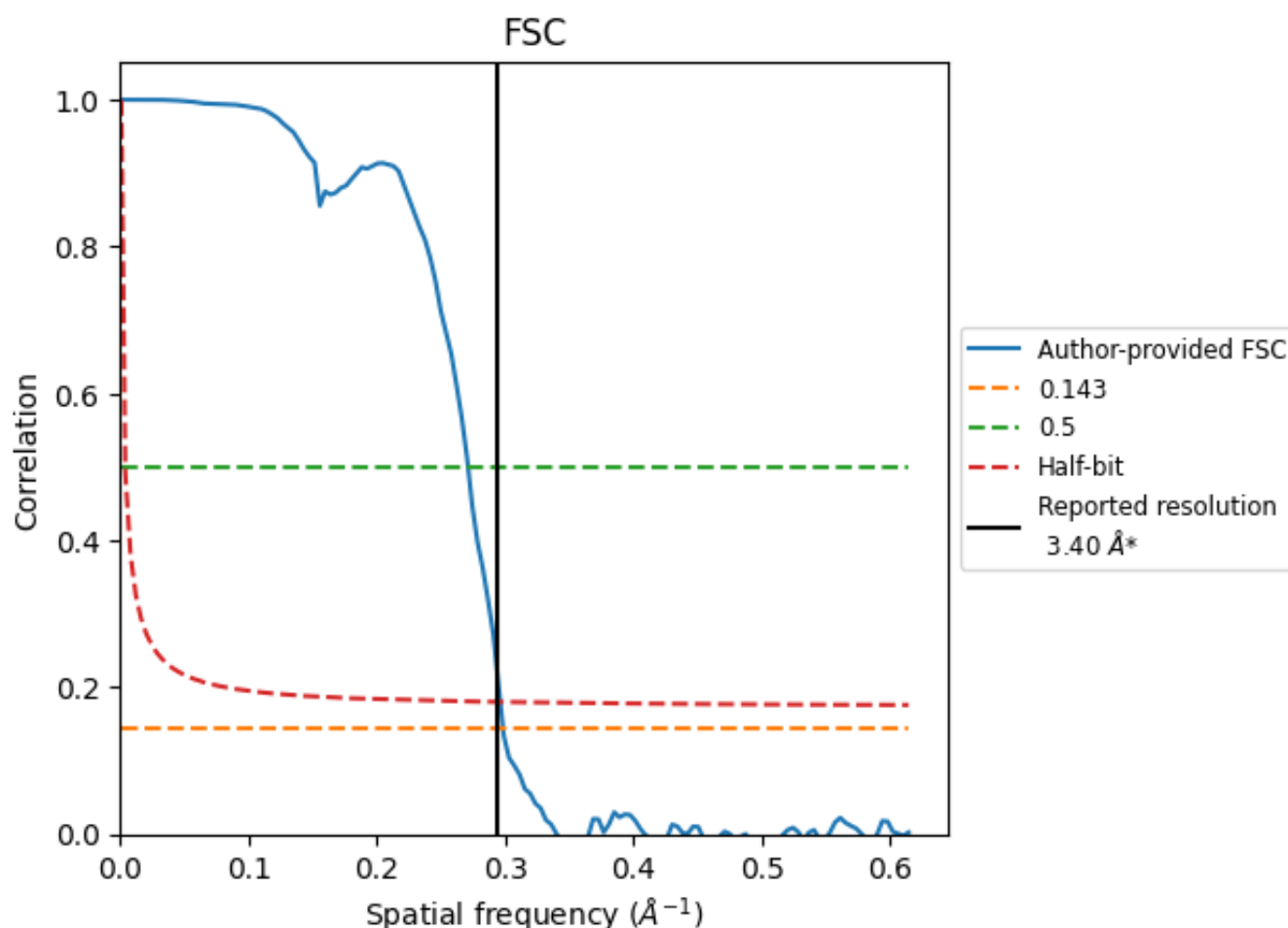


\*Reported resolution corresponds to spatial frequency of 0.294 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.294 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.40	-	-
Author-provided FSC curve	3.35	3.69	3.38
Unmasked-calculated*	-	-	-

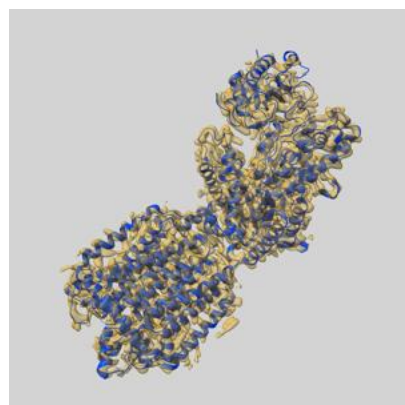
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.



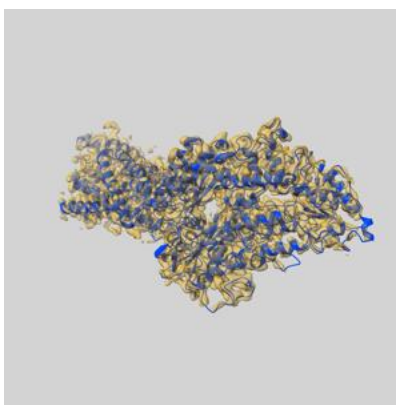
## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-4936 and PDB model 6RMG. Per-residue inclusion information can be found in section [3](#) on page [10](#).

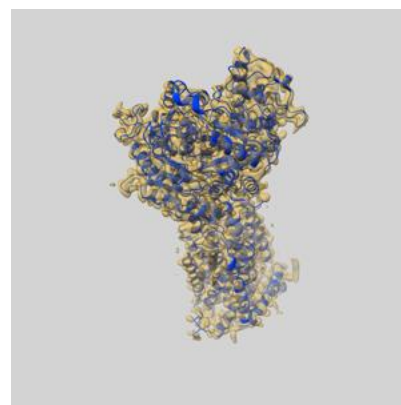
### 9.1 Map-model overlay [i](#)



X



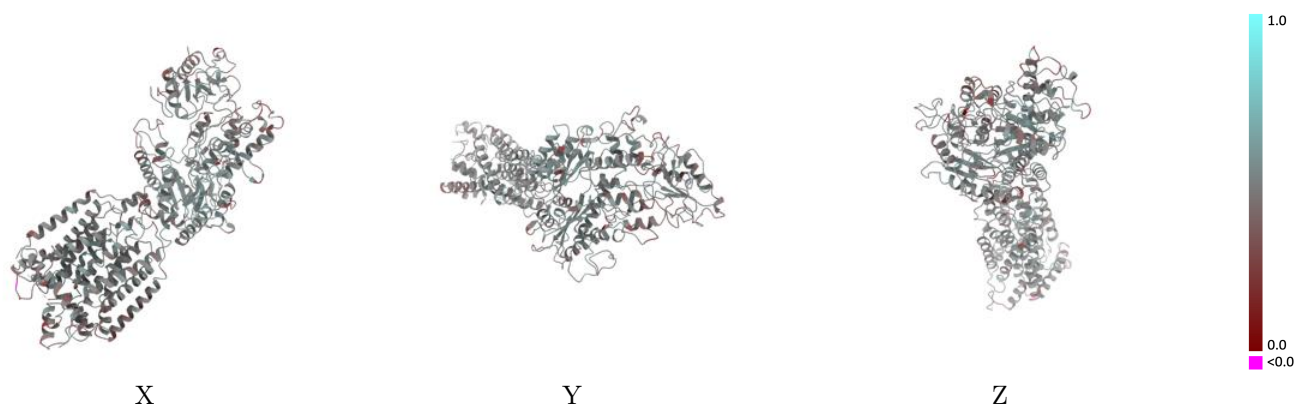
Y



Z

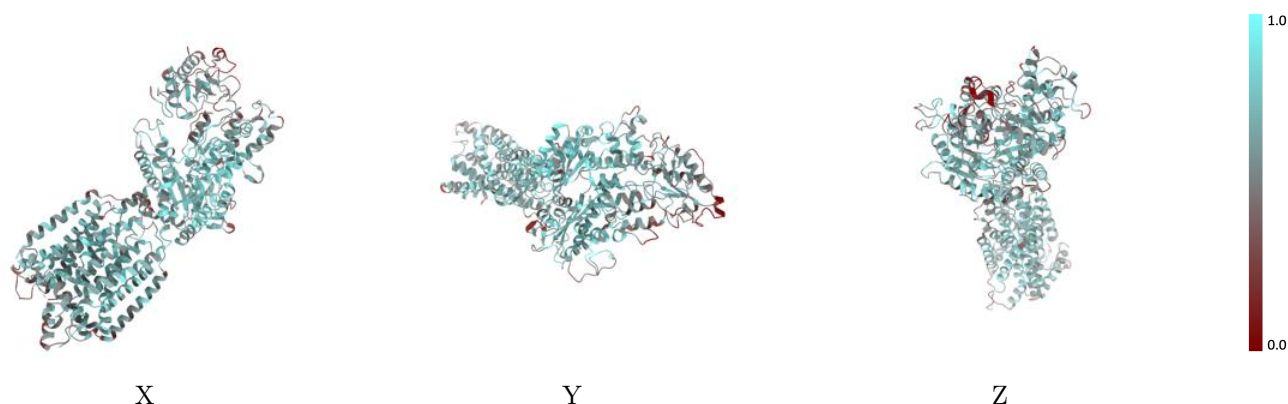
The images above show the 3D surface view of the map at the recommended contour level 0.016 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



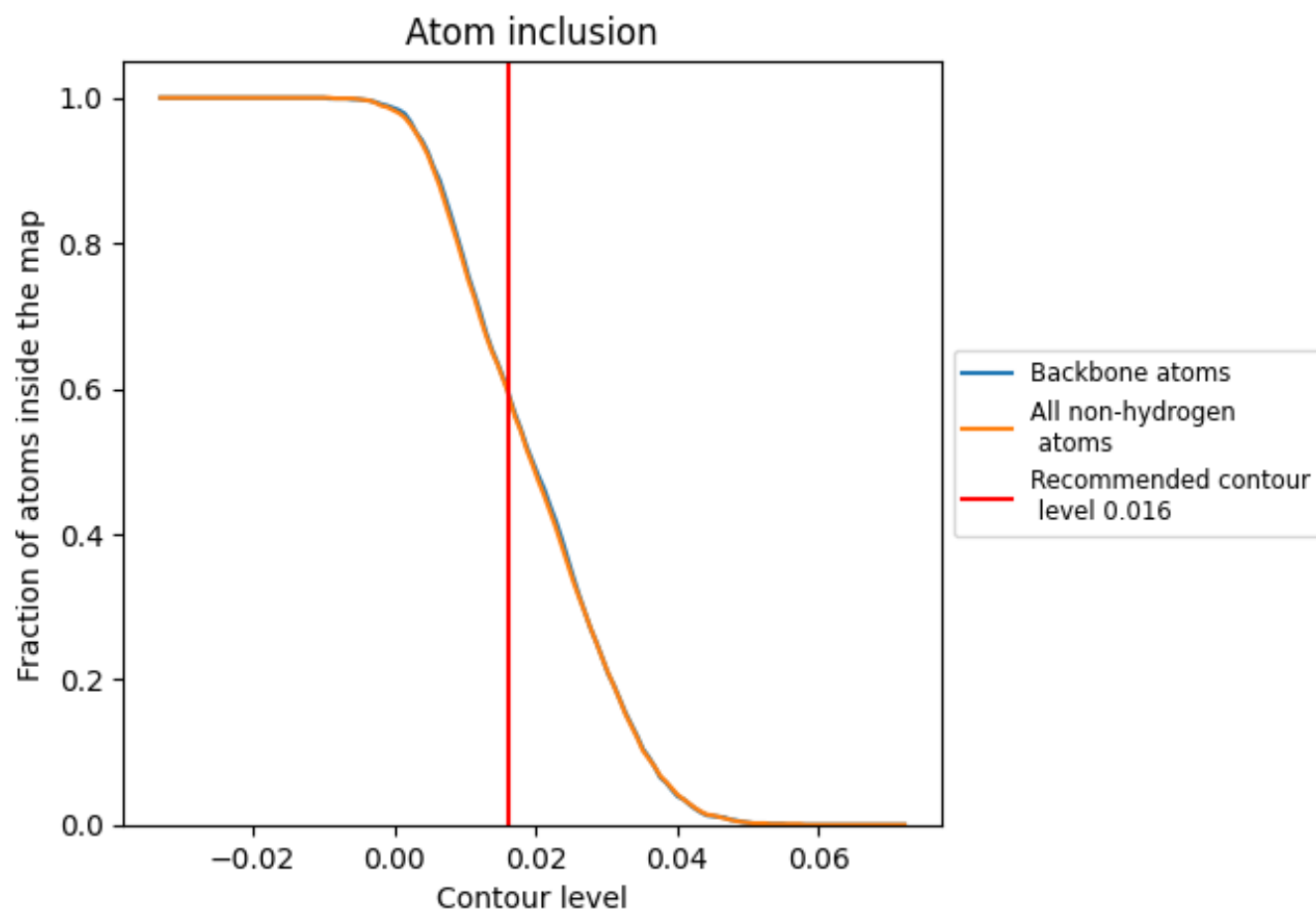
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.016).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 60% of all backbone atoms, 60% 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 (0.016) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div></div> 0.5970	<div></div> 0.4740
A	<div></div> 0.6250	<div></div> 0.4740
B	<div></div> 0.4910	<div></div> 0.4720
C	<div></div> 0.2860	<div></div> 0.4540

