WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB EM Validation Report ⓘ

Nov 20, 2022 – 03:49 PM JST

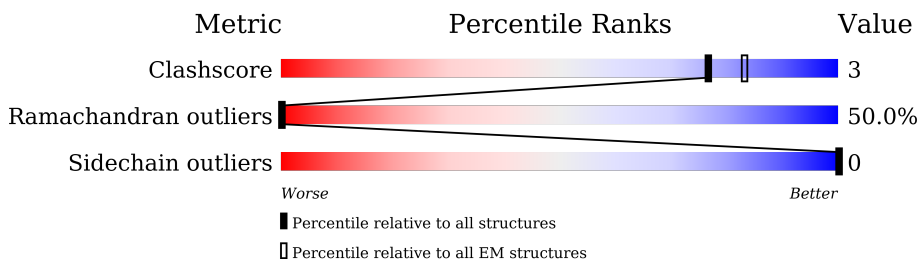|		
PDB ID	:	7C4U
EMDB ID	:	EMD-30288
Title	:	MicroED structure of orthorhombic Vancomycin at 1.2 A resolution
Authors	:	Fan, Q.; Zhou, H.; Li, X.; Wang, J.
Deposited on	:	2020-05-18
Resolution	:	1.20 Å(reported)
Based on initial model	:	1FVM

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 1.20 Å.

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

Metric	Percentile Ranks	Value
Clashscore		3
Ramachandran outliers		50.0%
Sidechain outliers		0

Worse — *Better*

▮ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

| Mol	Chain	Length	Quality of chain
1	A	7	14% / 71% / 14%
1	B	7	86% / 14%
2	C	2	100%
2	D	2	100%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 253 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 Vancomycin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	7	Total	C	Cl	N	O	0	0
			80	53	2	8	17		
1	B	7	Total	C	Cl	N	O	0	0
			80	53	2	8	17		

- Molecule 2 is an oligosaccharide called vancosamine-(1-2)-beta-D-glucopyranose.
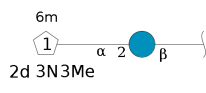
Mol	Chain	Residues	Atoms				AltConf	Trace
2	C	2	Total	C	N	O	0	0
			21	13	1	7		
2	D	2	Total	C	N	O	0	0
			21	13	1	7		

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 4 is water.

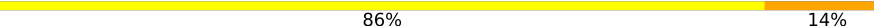| Mol	Chain	Residues	Atoms		AltConf
4	A	18	Total	O	0
			18	18	
4	B	32	Total	O	0
			32	32	

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: Vancomycin

Chain A:

14%   71%   14%

MLU1 DM22 N3 G4 G5 Y6 3FG7
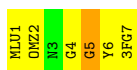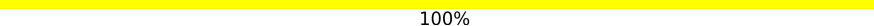
• Molecule 1: Vancomycin

Chain B:

86%   14%

MLU1 DM22 N3 G4 G5 Y6 3FG7

• Molecule 2: vancosamine-(1-2)-beta-D-glucopyranose

Chain C:

100%

BGC1 RER2

• Molecule 2: vancosamine-(1-2)-beta-D-glucopyranose

Chain D:

100%

BGC1 RER2

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	CRYSTALLOGRAPHY	Depositor
Imposed symmetry	3D CRYSTAL, a=20.06 Å, b=33.02 Å, c=41.72 Å, α=90.00°, β=90.00°, γ=90.00°, space group=P 2 21 21	Depositor
Number of images used	Not provided	
Resolution determination method	DIFFRACTION PATTERN/LAYERLINES	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TECNAI F20	Depositor
Voltage (kV)	200	Depositor
Electron dose $(e^-/\text{Å}^2)$	0.0286	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN ULTRASCAN 4000 (4k x 4k)	Depositor
Maximum map value	12.609	Depositor
Minimum map value	-2.096	Depositor
Average map value	-0.004	Depositor
Map value standard deviation	0.878	Depositor
Recommended contour level	1.8	Depositor
Map size (Å)	35.94069, 30.925709, 29.81127	wwPDB
Map dimensions	107, 111, 129	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.27861, 0.27861, 0.27861	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: OMZ, 3FG, CL, BGC, RER, GHP, OMY, MLU

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	0.60	0/7	0.46	0/8
1	B	0.72	0/7	1.33	0/8
All	All	0.66	0/14	1.00	0/16

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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	80	0	43	1	0
1	B	80	0	44	1	0
2	C	21	0	22	0	0
2	D	21	0	22	0	0
3	A	1	0	0	0	0
4	A	18	0	0	0	0
4	B	32	0	0	0	0
All	All	253	0	131	1	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 3.

All (1) 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:5:GHP:O	1:B:4:GHP:HA	2.21	0.41

There are no symmetry-related clashes.

5.3   Torsion angles ⓘ

5.3.1   Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1/7 (14%)	1 (100%)	0	0	100	100
1	B	1/7 (14%)	0	0	1 (100%)	0	0
All	All	2/14 (14%)	1 (50%)	0	1 (50%)	0	0

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	3	ASN

5.3.2   Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	1/1 (100%)	1 (100%)	0	100	100
1	B	1/1 (100%)	1 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	2/2 (100%)	2 (100%)	0	100 100

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

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

5.3.3   RNA ⓘ

There are no RNA molecules in this entry.

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

12 non-standard protein/DNA/RNA residues 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
1	GHP	A	4	1,2	10,11,12	2.11	1 (10%)	11,14,16	0.99	0
1	3FG	B	7	1	12,13,13	1.53	1 (8%)	14,18,18	1.13	1 (7%)
1	GHP	A	5	1	10,11,12	1.70	1 (10%)	11,14,16	1.08	0
1	OMZ	A	2	1	12,14,15	1.47	2 (16%)	17,19,21	1.40	2 (11%)
1	3FG	A	7	1	12,13,13	1.41	1 (8%)	14,18,18	1.17	1 (7%)
1	MLU	A	1	1	7,8,9	0.95	1 (14%)	6,9,11	1.73	2 (33%)
1	MLU	B	1	1	7,8,9	0.92	1 (14%)	6,9,11	1.46	1 (16%)
1	OMZ	B	2	1	12,14,15	1.87	3 (25%)	17,19,21	1.45	3 (17%)
1	OMY	A	6	1	12,14,15	1.42	1 (8%)	17,19,21	3.19	6 (35%)
1	OMY	B	6	1	12,14,15	1.34	1 (8%)	17,19,21	2.69	5 (29%)
1	GHP	B	5	1	10,11,12	1.72	2 (20%)	11,14,16	1.25	0
1	GHP	B	4	1,2	10,11,12	1.59	1 (10%)	11,14,16	0.56	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
1	GHP	A	4	1,2	-	2/4/6/8	0/1/1/1
1	3FG	B	7	1	-	2/8/8/8	0/1/1/1
1	GHP	A	5	1	-	0/4/6/8	0/1/1/1
1	OMZ	A	2	1	-	1/9/10/12	0/1/1/1
1	3FG	A	7	1	-	2/8/8/8	0/1/1/1
1	MLU	A	1	1	-	2/5/8/10	-
1	MLU	B	1	1	-	0/5/8/10	-
1	OMZ	B	2	1	-	1/9/10/12	0/1/1/1
1	OMY	A	6	1	-	1/9/10/12	0/1/1/1
1	OMY	B	6	1	-	1/9/10/12	0/1/1/1
1	GHP	B	5	1	-	0/4/6/8	0/1/1/1
1	GHP	B	4	1,2	-	0/4/6/8	0/1/1/1

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	4	GHP	C1-CA	-5.78	1.46	1.52
1	A	5	GHP	C1-CA	-5.02	1.47	1.52
1	B	7	3FG	CB-CA	-4.56	1.47	1.52
1	A	7	3FG	CB-CA	-4.16	1.47	1.52
1	B	5	GHP	C1-CA	-4.13	1.48	1.52
1	B	4	GHP	C1-CA	-4.00	1.48	1.52
1	B	6	OMY	OCZ-CZ	3.97	1.44	1.36
1	A	6	OMY	OCZ-CZ	3.85	1.44	1.36
1	B	2	OMZ	OC-CB	-3.69	1.35	1.42
1	B	2	OMZ	CE1-CL	-2.76	1.67	1.73
1	A	2	OMZ	CZ-CE1	-2.61	1.37	1.39
1	B	2	OMZ	CG-CB	-2.36	1.48	1.51
1	B	5	GHP	CA-C	2.36	1.55	1.51
1	A	2	OMZ	OC-CB	-2.27	1.38	1.42
1	B	1	MLU	O-C	2.17	1.28	1.19
1	A	1	MLU	O-C	2.07	1.28	1.19

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	6	OMY	CG-CB-CA	-11.03	96.72	111.49
1	B	6	OMY	CG-CB-CA	-9.34	98.99	111.49
1	B	2	OMZ	O-C-CA	-4.00	114.29	124.78

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	2	OMZ	O-C-CA	-3.94	114.46	124.78
1	A	6	OMY	CD2-CG-CD1	3.25	122.50	118.76
1	A	6	OMY	CD1-CG-CB	-3.16	114.16	119.55
1	A	6	OMY	CE2-CZ-CE1	3.02	121.48	118.55
1	A	6	OMY	CD2-CE2-CZ	-2.88	117.55	120.50
1	B	6	OMY	CD2-CG-CD1	2.83	122.03	118.76
1	A	1	MLU	O-C-CA	-2.77	117.51	124.78
1	B	6	OMY	CE2-CZ-CE1	2.69	121.17	118.55
1	B	1	MLU	O-C-CA	-2.60	117.97	124.78
1	B	2	OMZ	OC-CB-CA	2.54	112.64	107.28
1	A	2	OMZ	OC-CB-CA	2.41	112.37	107.28
1	A	7	3FG	CD2-CZ-CD1	-2.39	116.35	119.20
1	A	1	MLU	CG-CB-CA	-2.38	109.41	115.34
1	B	6	OMY	CE2-CD2-CG	-2.30	118.88	121.20
1	B	7	3FG	CD2-CZ-CD1	-2.30	116.45	119.20
1	B	2	OMZ	CG-CB-CA	-2.23	108.51	111.49
1	B	6	OMY	CD1-CG-CB	-2.19	115.81	119.55
1	A	6	OMY	CE1-CD1-CG	-2.13	117.20	120.29

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	2	OMZ	O-C-CA-CB
1	B	2	OMZ	O-C-CA-CB
1	A	6	OMY	O-C-CA-CB
1	B	6	OMY	O-C-CA-CB
1	A	7	3FG	C-CA-CB-CG1
1	A	7	3FG	C-CA-CB-CG2
1	B	7	3FG	C-CA-CB-CG1
1	B	7	3FG	C-CA-CB-CG2
1	A	1	MLU	N-CA-CB-CG
1	A	1	MLU	CA-CB-CG-CD2
1	A	4	GHP	C2-C1-CA-N
1	A	4	GHP	C6-C1-CA-N

There are no ring outliers.

2 monomers are involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	5	GHP	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	4	GHP	1	0

5.5 Carbohydrates ⓘ

4 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	$\#|Z| > 2$
2	BGC	C	1	1,2	11,11,12	1.53	1 (9%)	15,15,17	1.78	5 (33%)
2	RER	C	2	2	6,10,11	1.45	1 (16%)	6,15,17	1.41	1 (16%)
2	BGC	D	1	1,2	11,11,12	1.55	3 (27%)	15,15,17	1.73	5 (33%)
2	RER	D	2	2	6,10,11	1.50	2 (33%)	6,15,17	0.96	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
2	BGC	C	1	1,2	-	0/2/19/22	0/1/1/1
2	RER	C	2	2	-	-	0/1/1/1
2	BGC	D	1	1,2	-	0/2/19/22	0/1/1/1
2	RER	D	2	2	-	-	0/1/1/1

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1	BGC	O5-C1	-3.14	1.38	1.43
2	D	1	BGC	O5-C1	-2.62	1.39	1.43
2	D	1	BGC	O2-C2	-2.48	1.38	1.43
2	D	2	RER	O5-C1	-2.33	1.38	1.44
2	D	1	BGC	O4-C4	-2.31	1.37	1.43
2	D	2	RER	O5-C5	-2.11	1.38	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	2	RER	O5-C1	-2.09	1.39	1.44

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	1	BGC	C1-C2-C3	-3.13	105.82	109.67
2	C	1	BGC	C3-C4-C5	-2.68	105.46	110.24
2	D	1	BGC	C6-C5-C4	-2.64	106.82	113.00
2	D	1	BGC	C1-C2-C3	-2.62	106.45	109.67
2	C	1	BGC	C6-C5-C4	-2.55	107.03	113.00
2	D	1	BGC	C3-C4-C5	-2.33	106.08	110.24
2	C	1	BGC	C2-C3-C4	-2.24	107.02	110.89
2	D	1	BGC	O5-C5-C6	2.15	110.57	107.20
2	D	1	BGC	O3-C3-C4	-2.14	105.39	110.35
2	C	2	RER	O5-C1-C2	2.06	114.28	111.38
2	C	1	BGC	O5-C5-C6	2.04	110.40	107.20

There are no chirality outliers.

There are no torsion outliers.

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.

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings
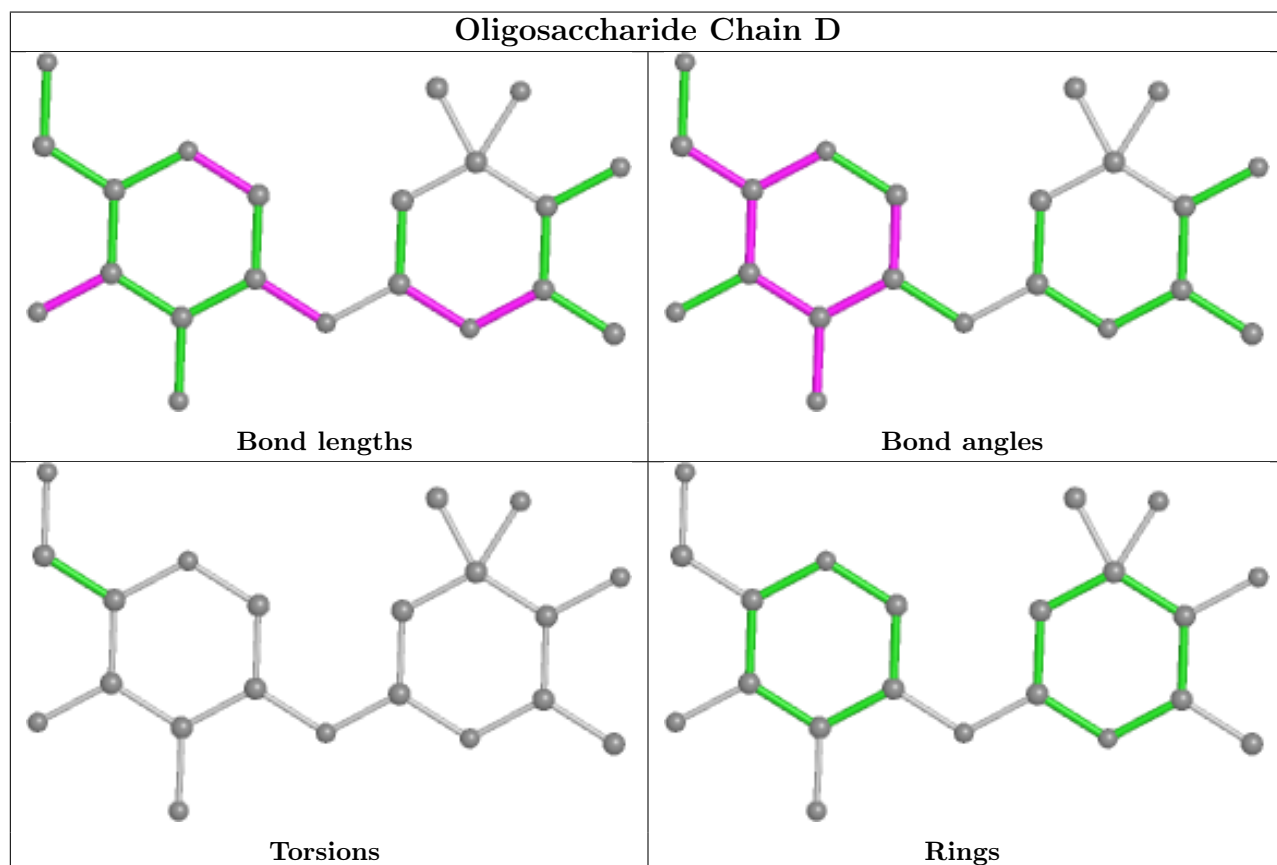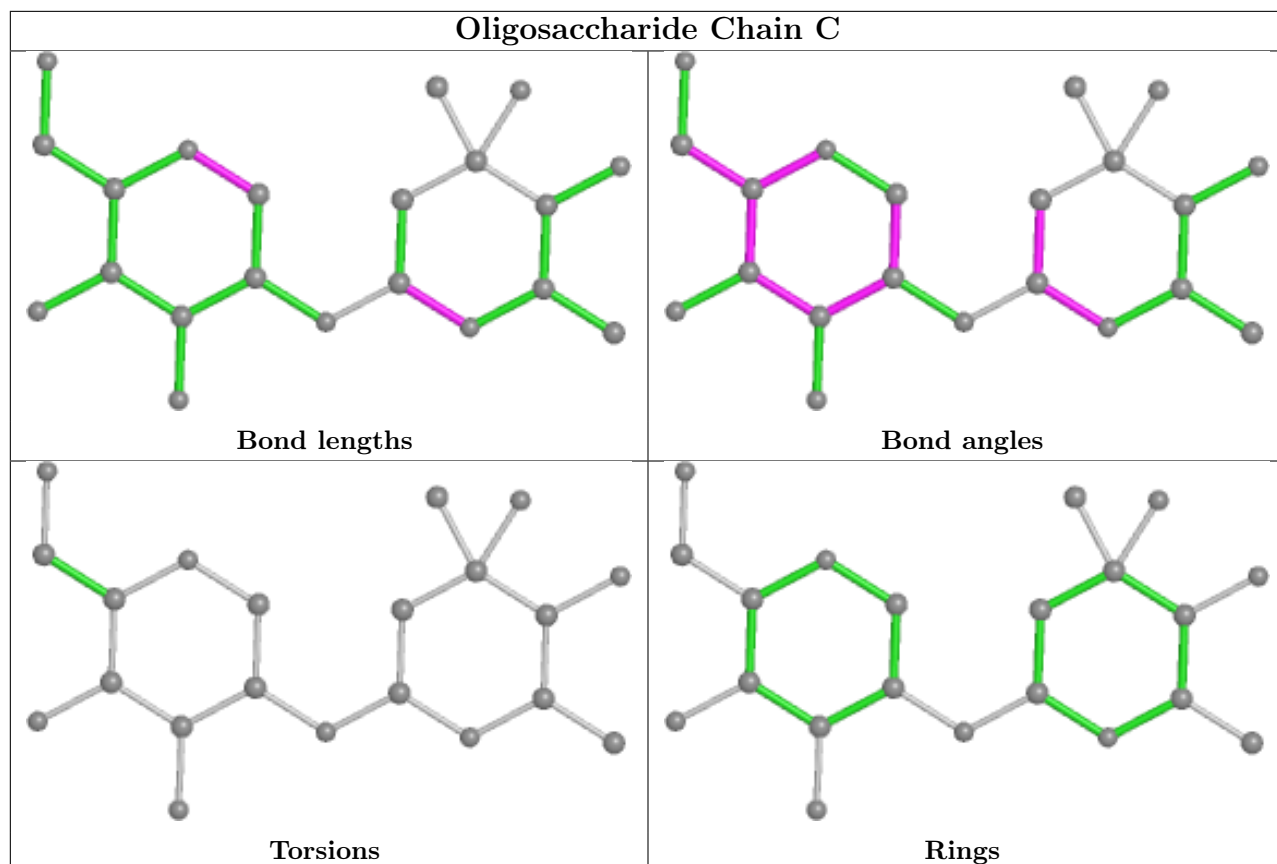
5.6 Ligand geometry ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-30288. 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 ⓘ

6.1.1 Primary map

X

Y

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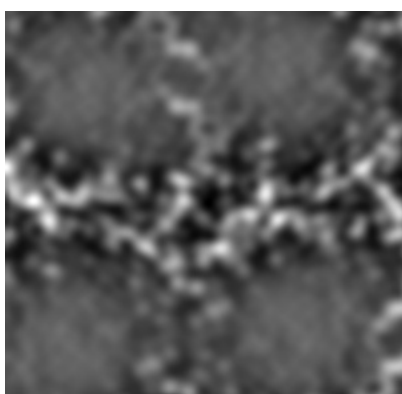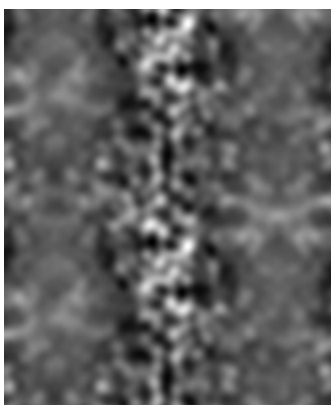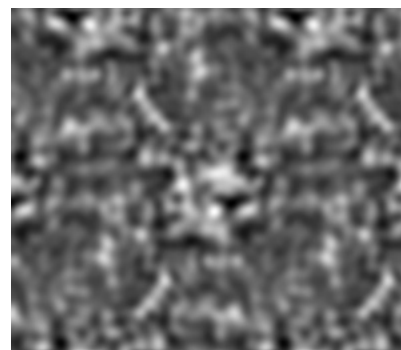
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
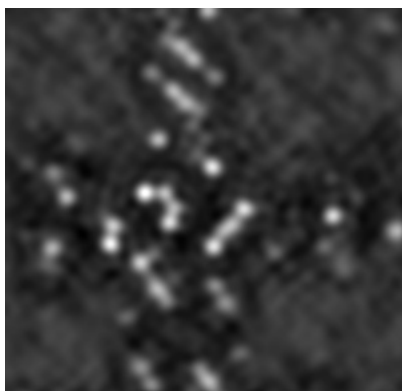
6.2.1 Primary map

X Index: 64
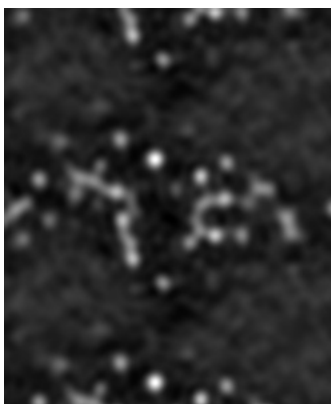
Y Index: 55
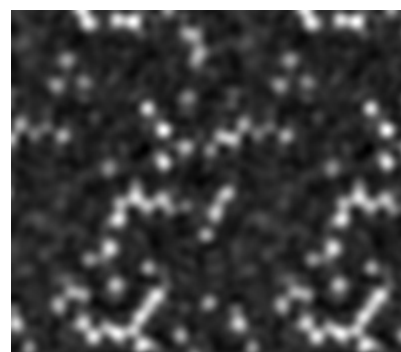
Z Index: 53

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

6.3 Largest variance slices (i)

6.3.1 Primary map
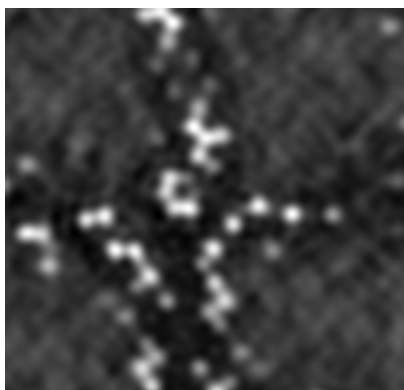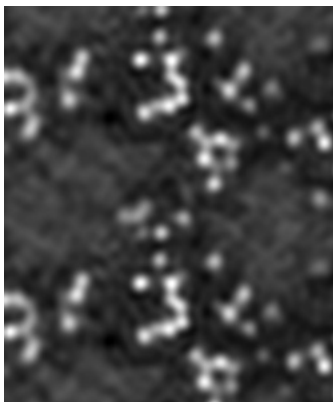
| X Index: 67 | Y Index: 106 | Z Index: 49 |
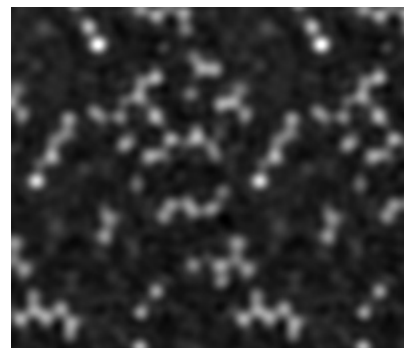
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views (i)

6.4.1 Primary map

| X | Y | Z |
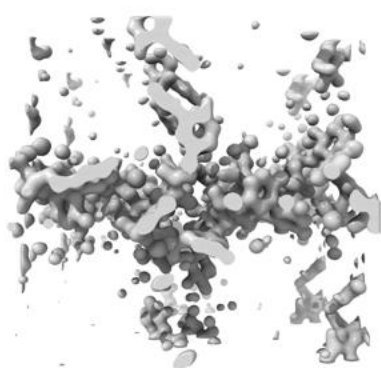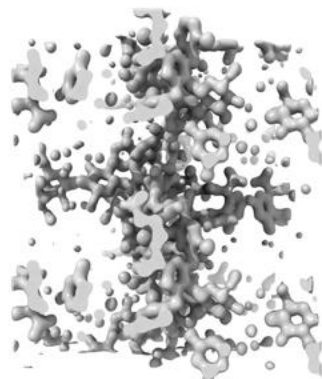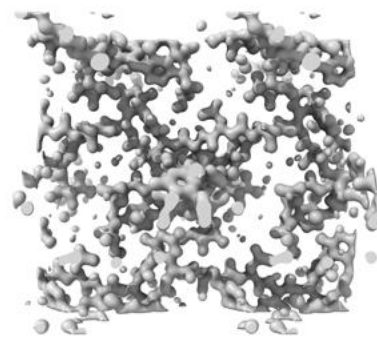
The images above show the 3D surface view of the map at the recommended contour level 1.8. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5 Mask visualisation ⓘ

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

7　Map analysis ⓘ

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

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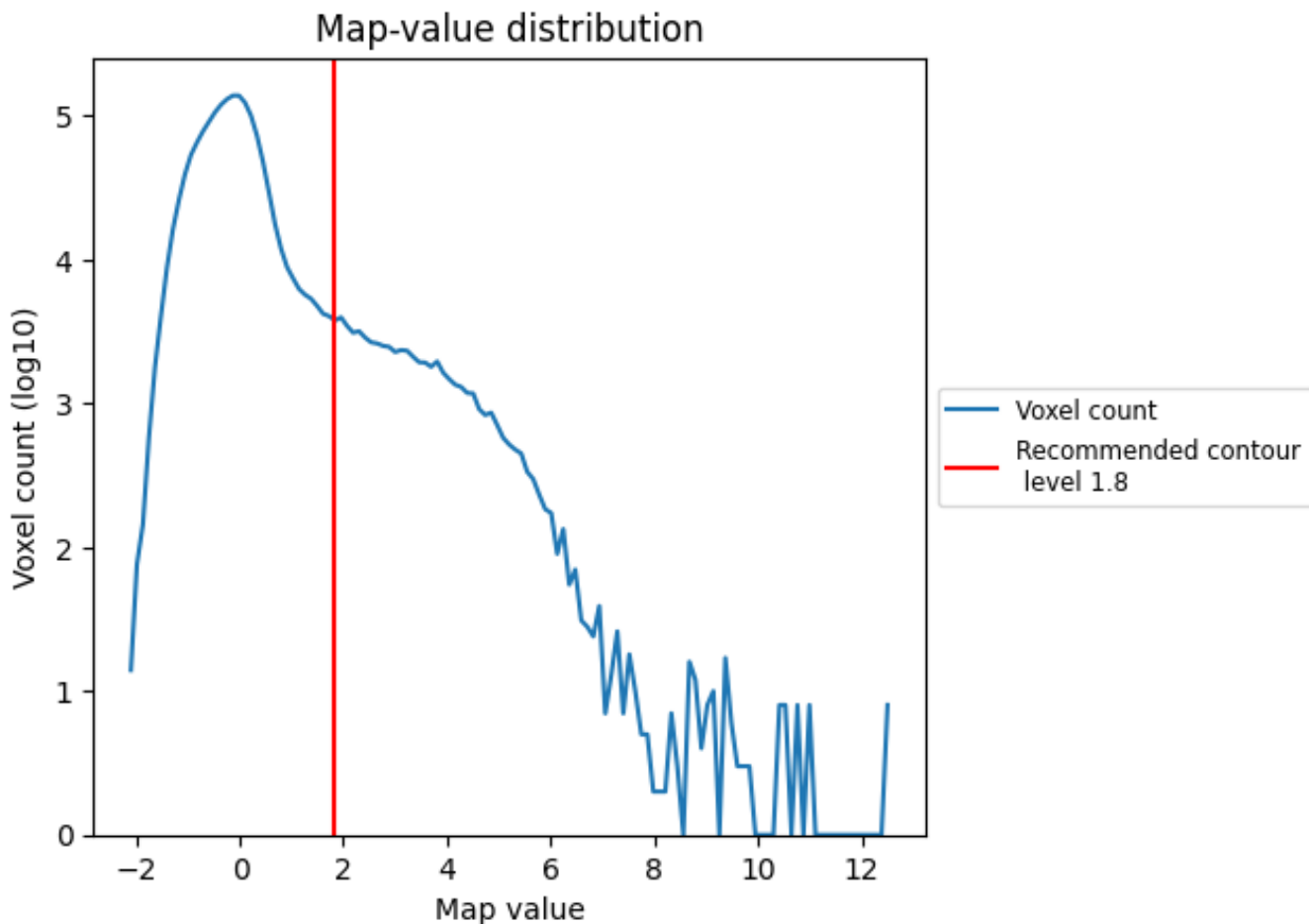
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate (i)
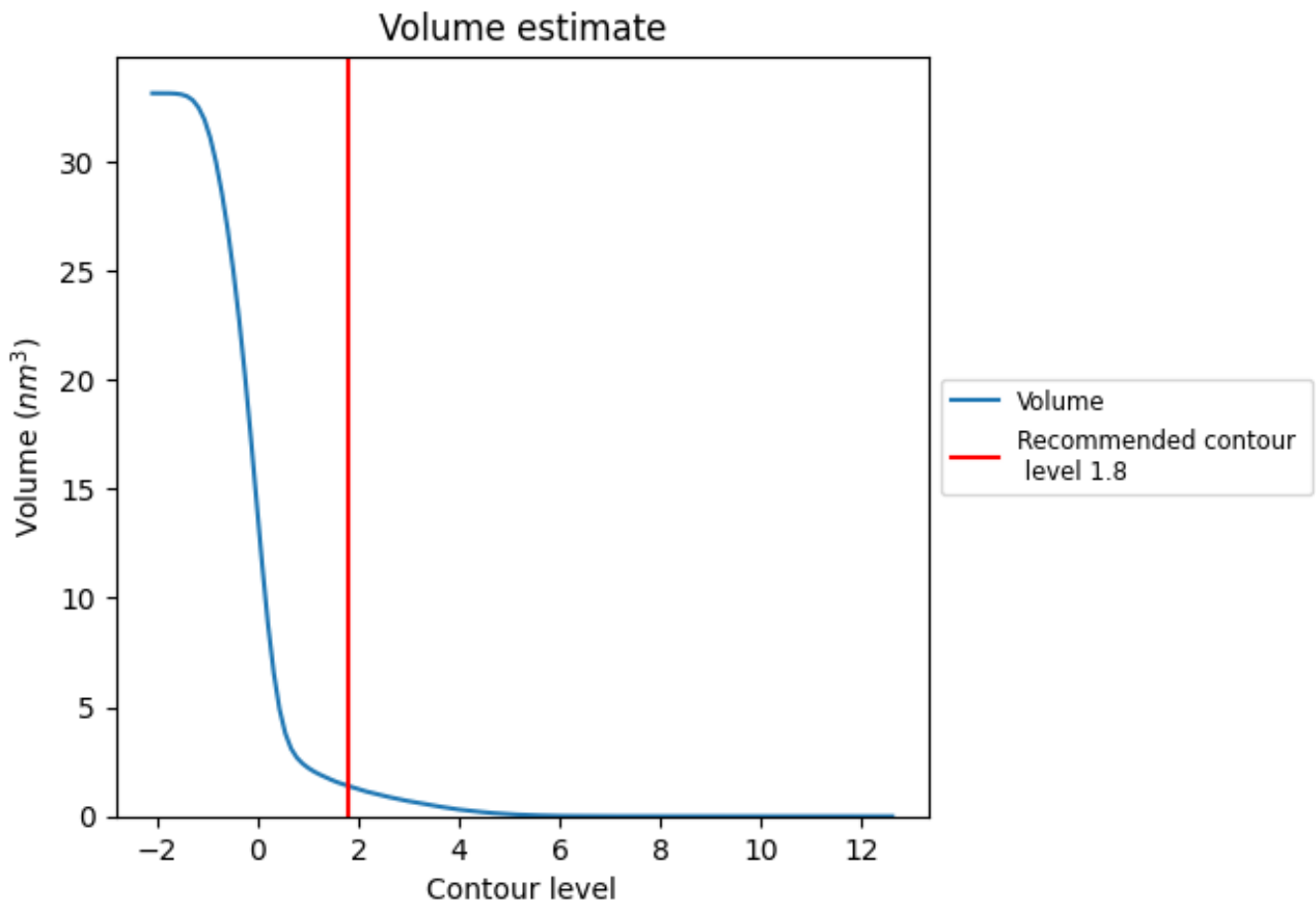
Volume estimate

The volume at the recommended contour level is 1 nm^3; this corresponds to an approximate mass of 1 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)

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

8 Fourier-Shell correlation ⓘ

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

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-30288 and PDB model 7C4U. Per-residue inclusion information can be found in section 3 on page 4.

9.1 Map-model overlay ⓘ

X   Y   Z
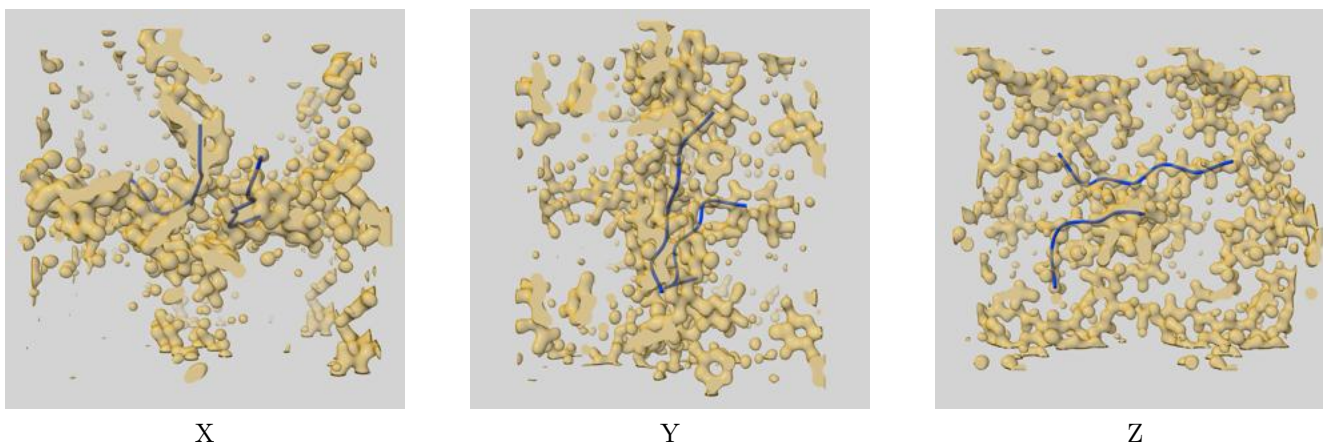
The images above show the 3D surface view of the map at the recommended contour level 1.8 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model

Q-score is only calculated for structures below 1.25 Å in resolution. The reported resolution for this entry is above 1.25 Å and so Q-score has not been calculated.

9.3 Atom inclusion mapped to coordinate model ⓘ
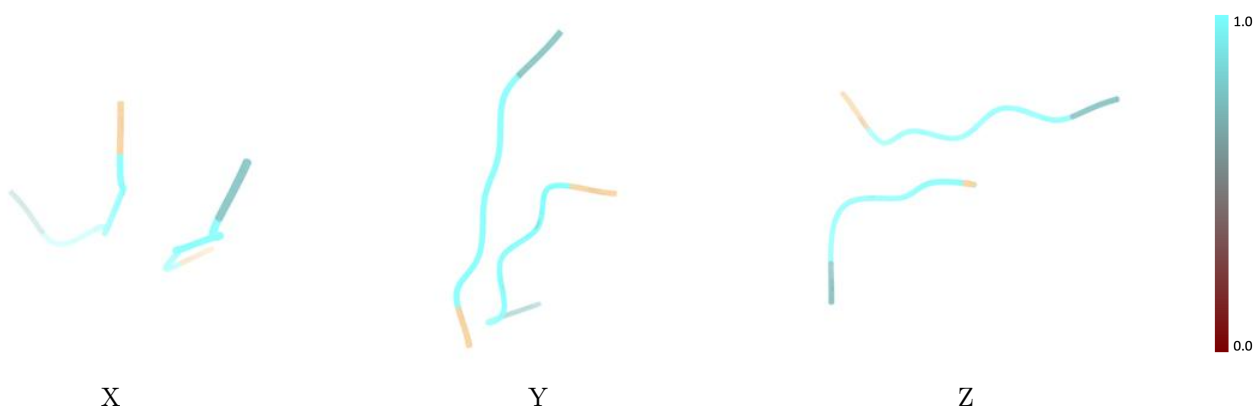
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (1.8).

9.4 Atom inclusion ⓘ
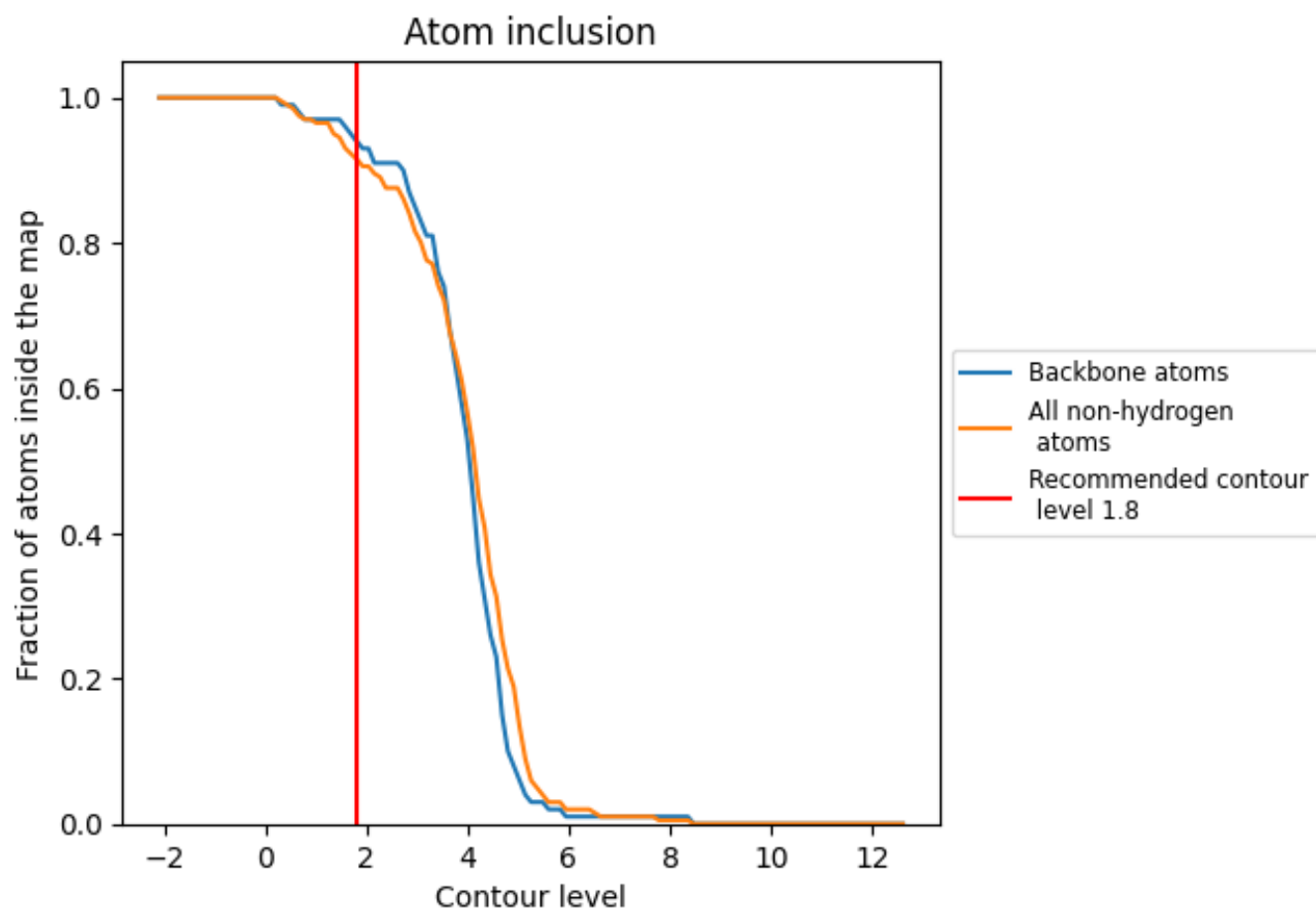
At the recommended contour level, 94% of all backbone atoms, 92% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary   ⓘ

The table lists the average atom inclusion at the recommended contour level (1.8) and Q-score for the entire model and for each chain.

Chain	Atom inclusion
All	0.9154
A	0.8250
B	0.9620
C	1.0000
D	1.0000

1.0

0.0
<0.0