# Resolution and accuracy in Congreve & Lamsdell matrices

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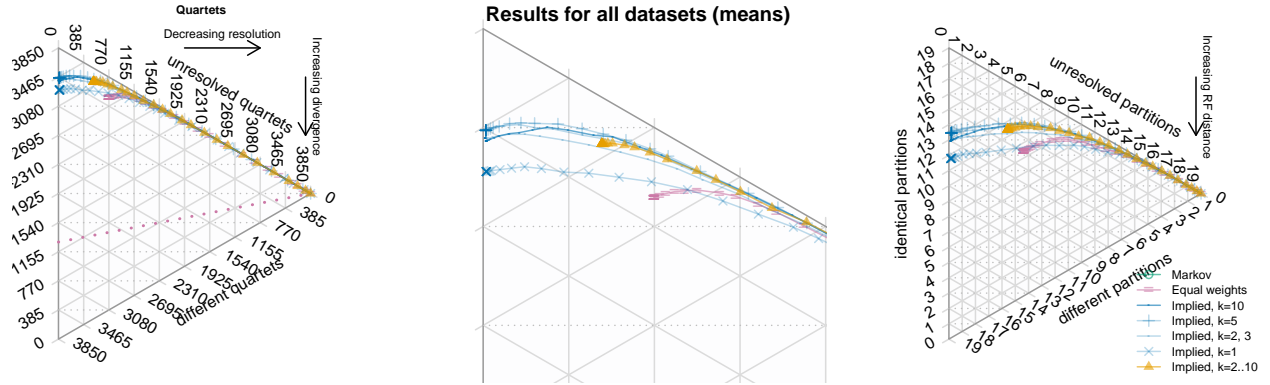
*2019-10-20*

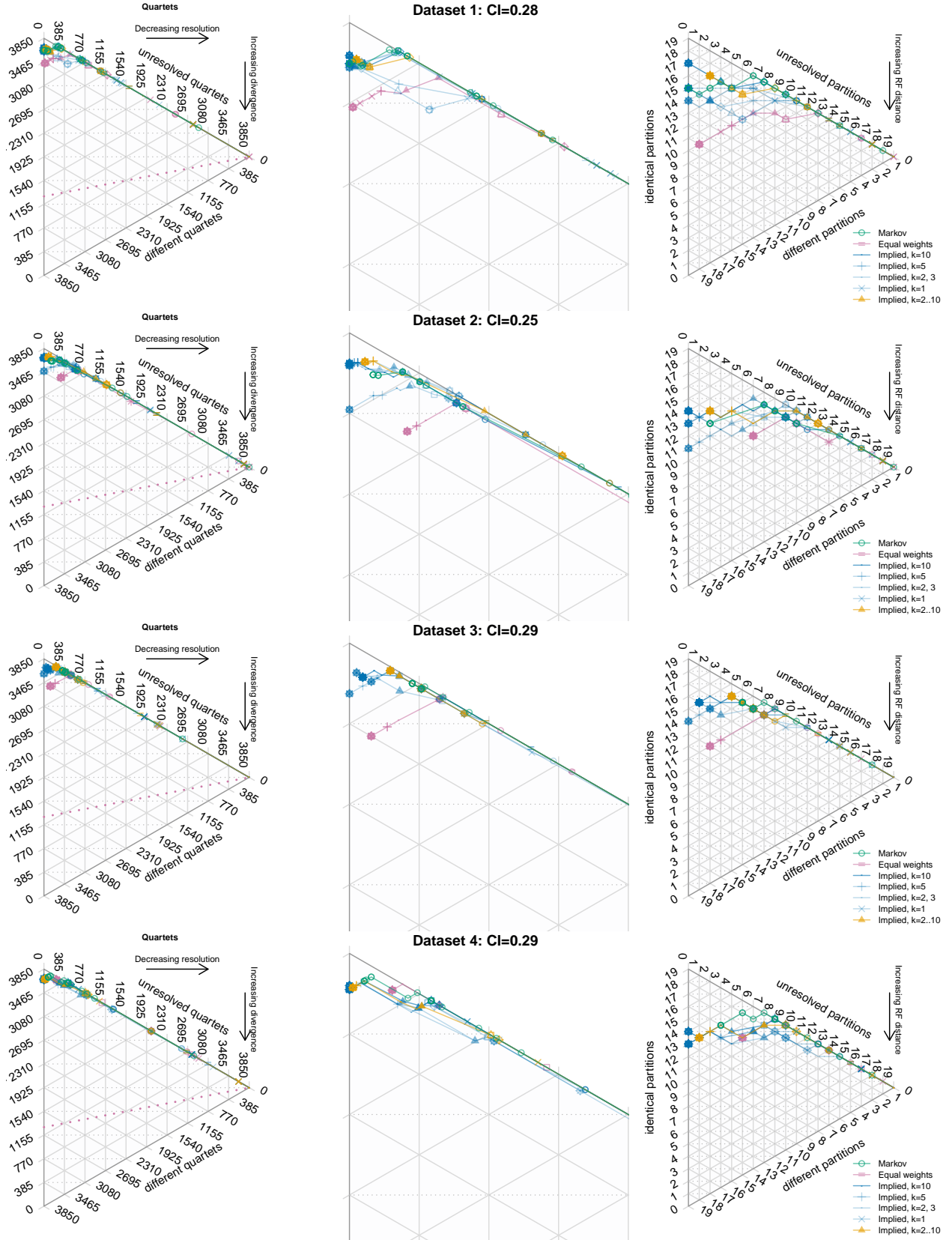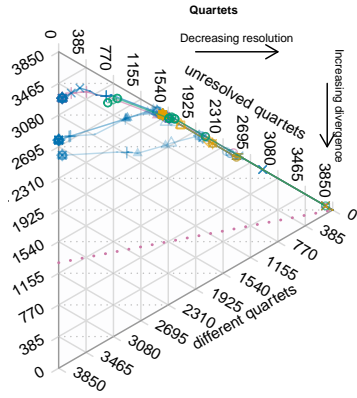## Contents

This page depicts the analytical results of all 100 matrices generated by Congreve & Lamsdell [1] using a ternary plotting approach [2], with quartets and partitions used as distance metrics.
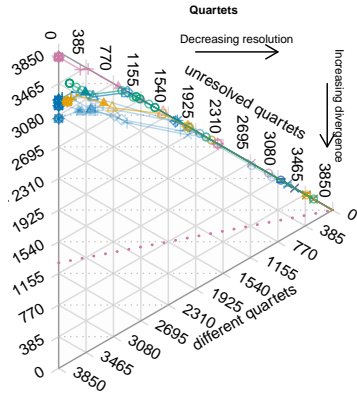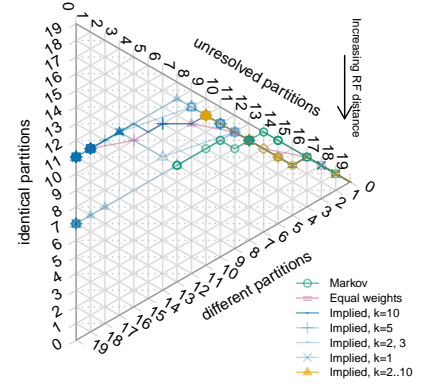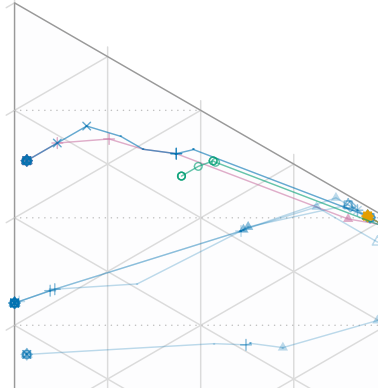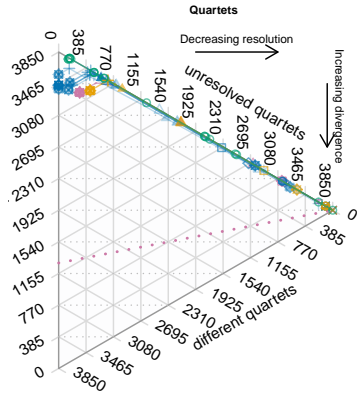
## 0.1   Summary



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## 0.2 Trees 1–10



**Quartets** — Decreasing resolution — unresolved quartets — Increasing divergence — different quartets

**Dataset 1: CI=0.28**

unresolved partitions — Increasing RF distance — identical partitions — different partitions

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

**Quartets** — Decreasing resolution — unresolved quartets — Increasing divergence — different quartets

**Dataset 2: CI=0.25**

unresolved partitions — Increasing RF distance — identical partitions — different partitions

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

**Quartets** — Decreasing resolution — unresolved quartets — Increasing divergence — different quartets

**Dataset 3: CI=0.29**

unresolved partitions — Increasing RF distance — identical partitions — different partitions

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

**Quartets** — Decreasing resolution — unresolved quartets — Increasing divergence — different quartets

**Dataset 4: CI=0.29**

unresolved partitions — Increasing RF distance — identical partitions — different partitions

- Markov
- Equal weights
- Implied, k=10
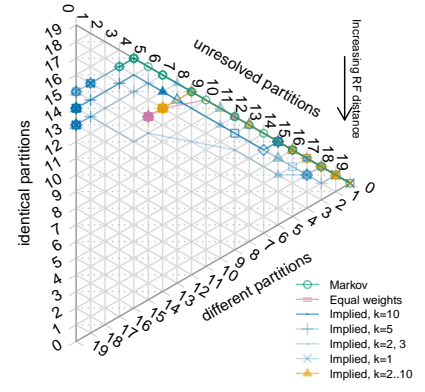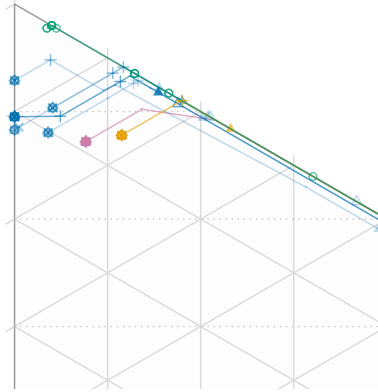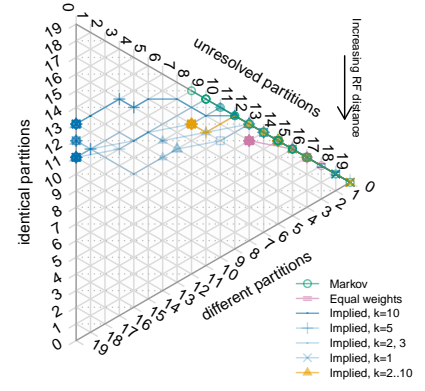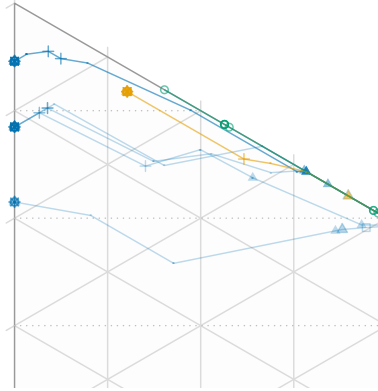- Implied, k=5
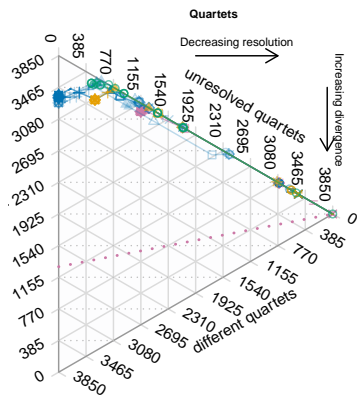- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10
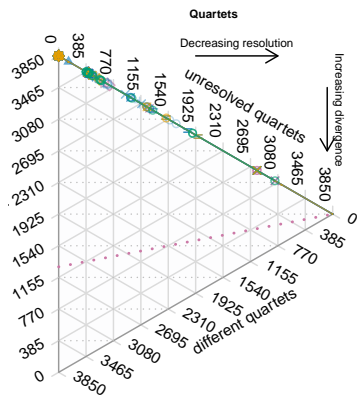
**Dataset 5: CI=0.26**

**Dataset 6: CI=0.26**
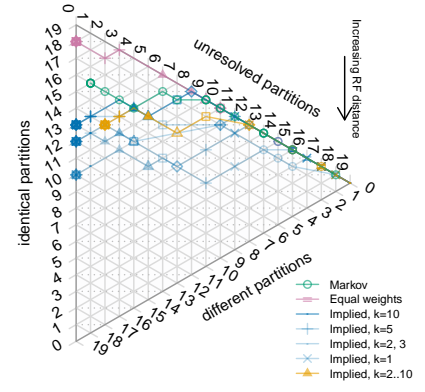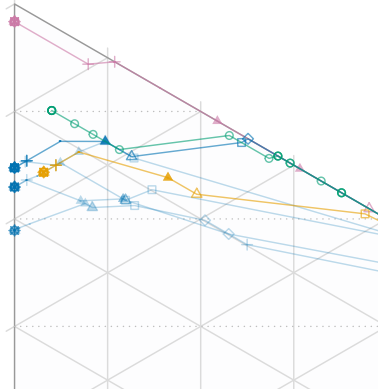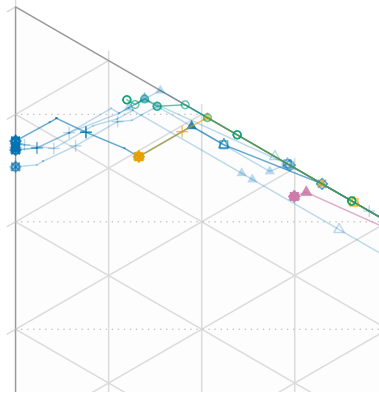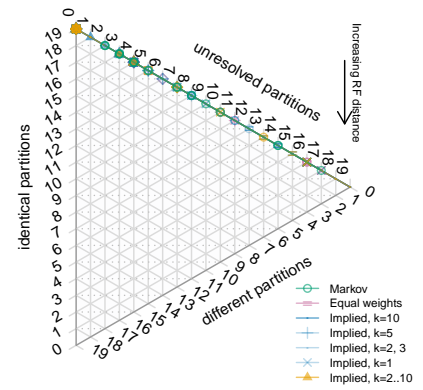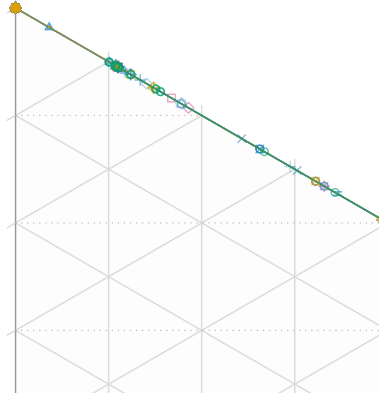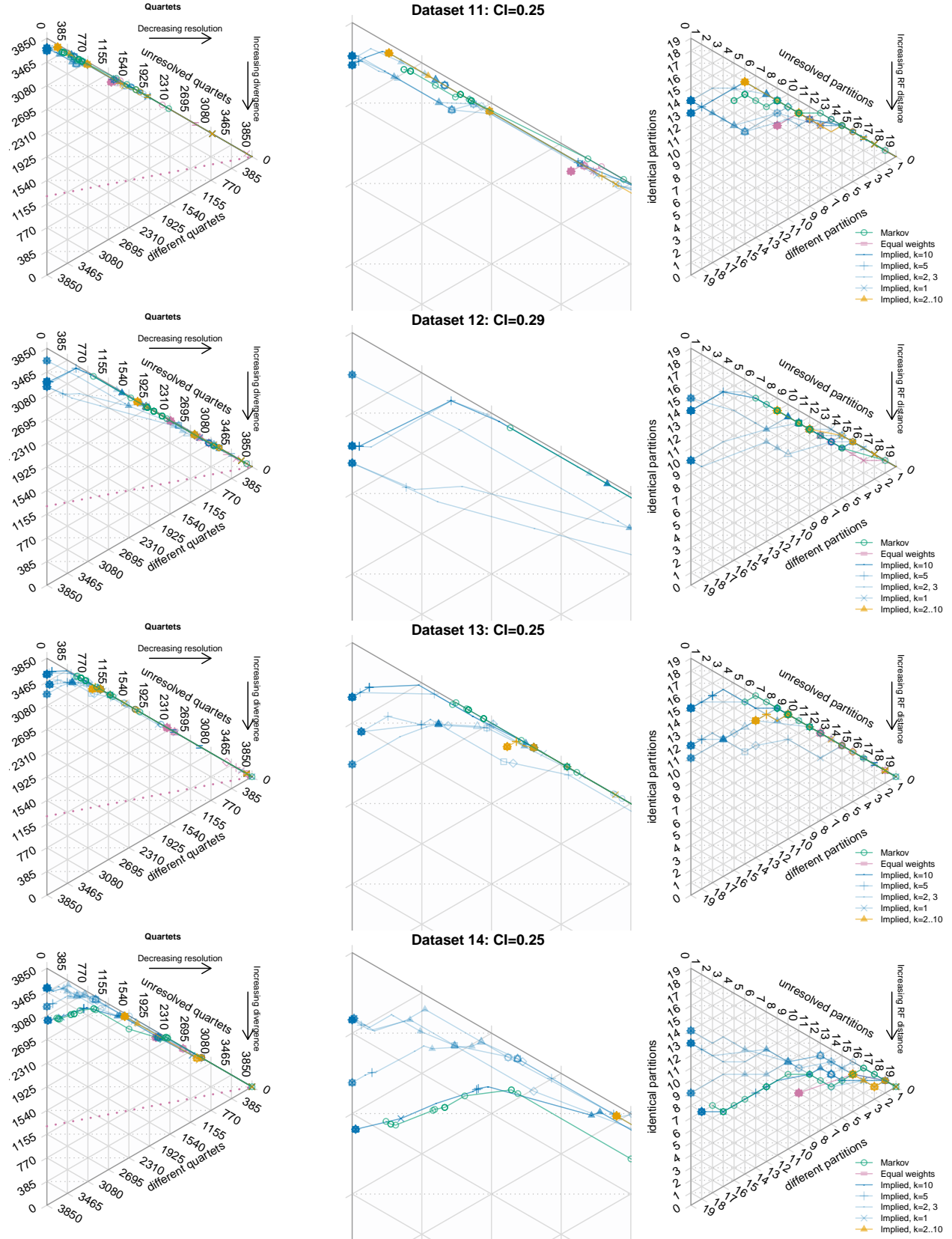
**Dataset 7: CI=0.27**

**Dataset 8: CI=0.25**

Quartets

Decreasing resolution
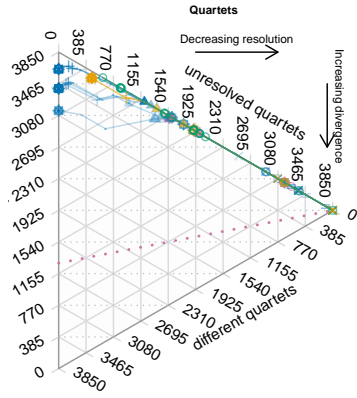
Dataset 9: CI=0.24

Dataset 10: CI=0.29

Markov
Equal weights
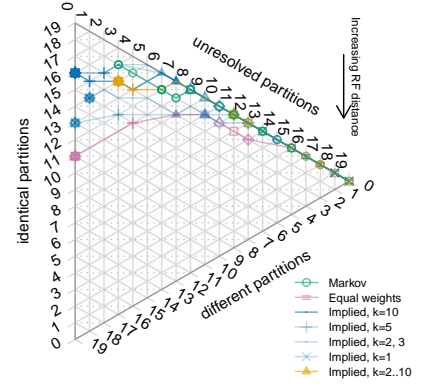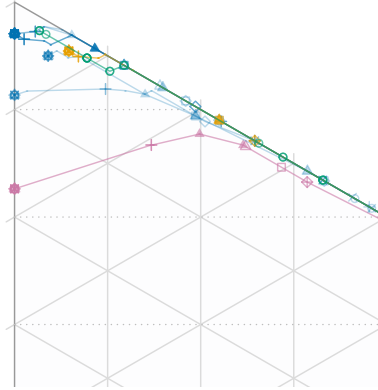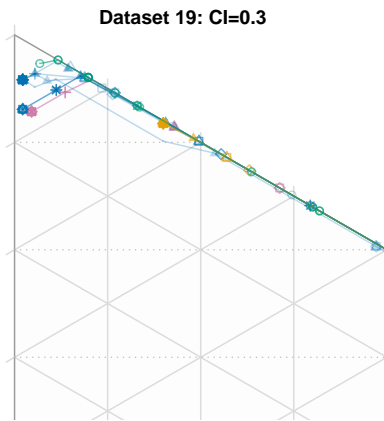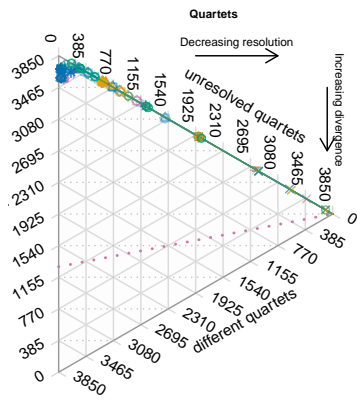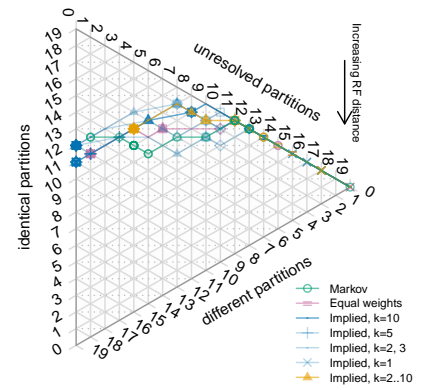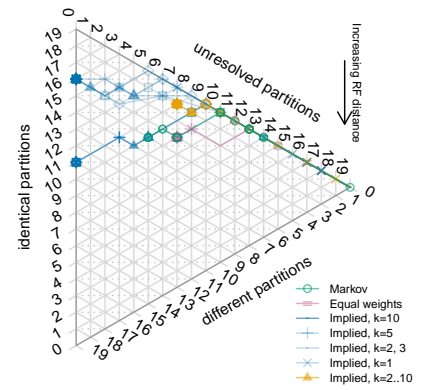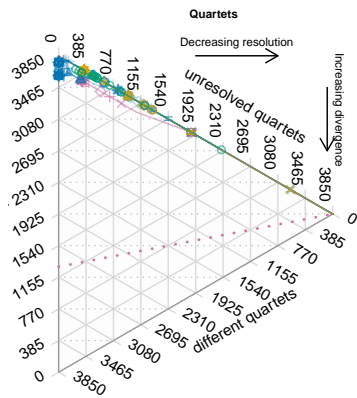Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

**Dataset 11: CI=0.25**

**Dataset 12: CI=0.29**
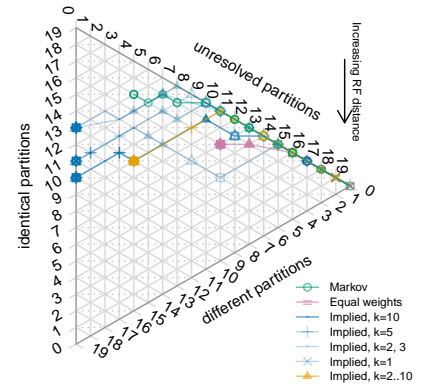
**Dataset 13: CI=0.25**
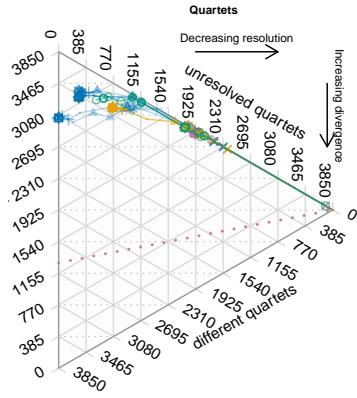
**Dataset 14: CI=0.25**
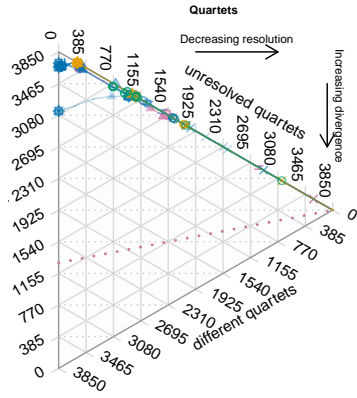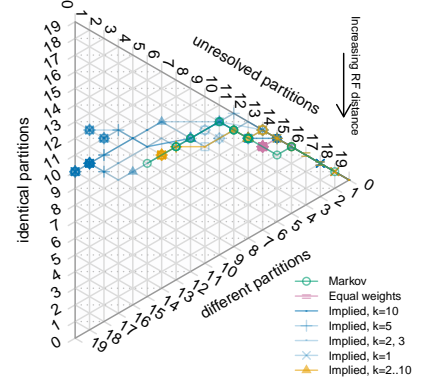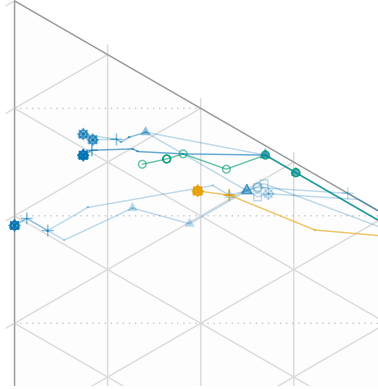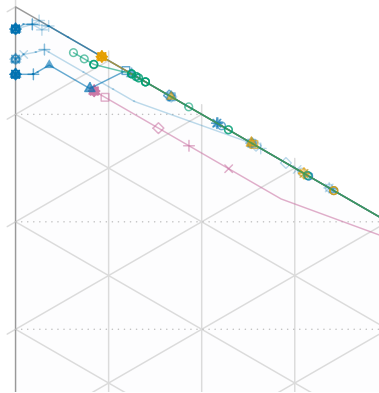
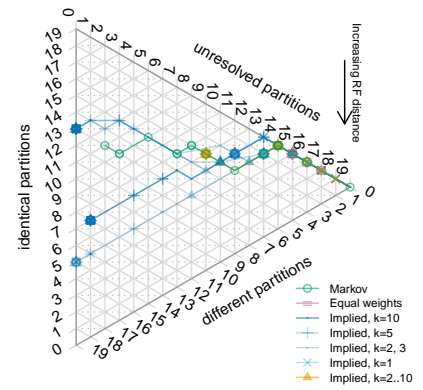**Dataset 15: CI=0.25**

**Dataset 16: CI=0.25**
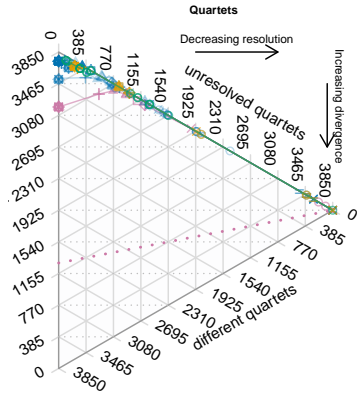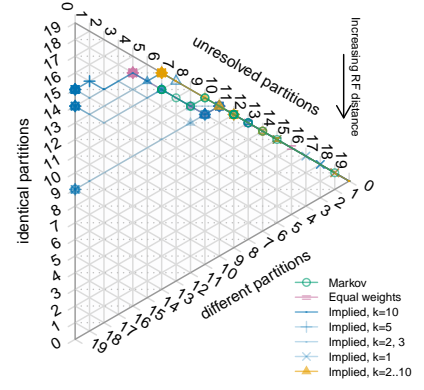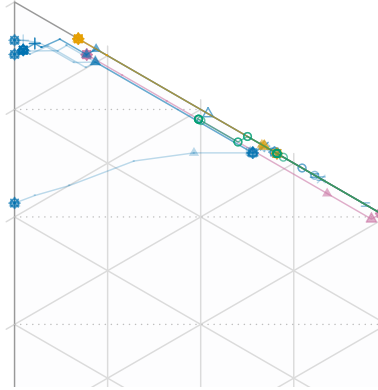
**Dataset 17: CI=0.27**

**Dataset 18: CI=0.28**

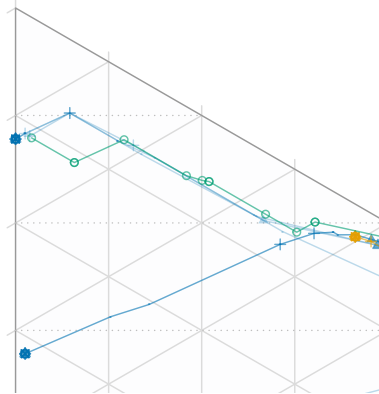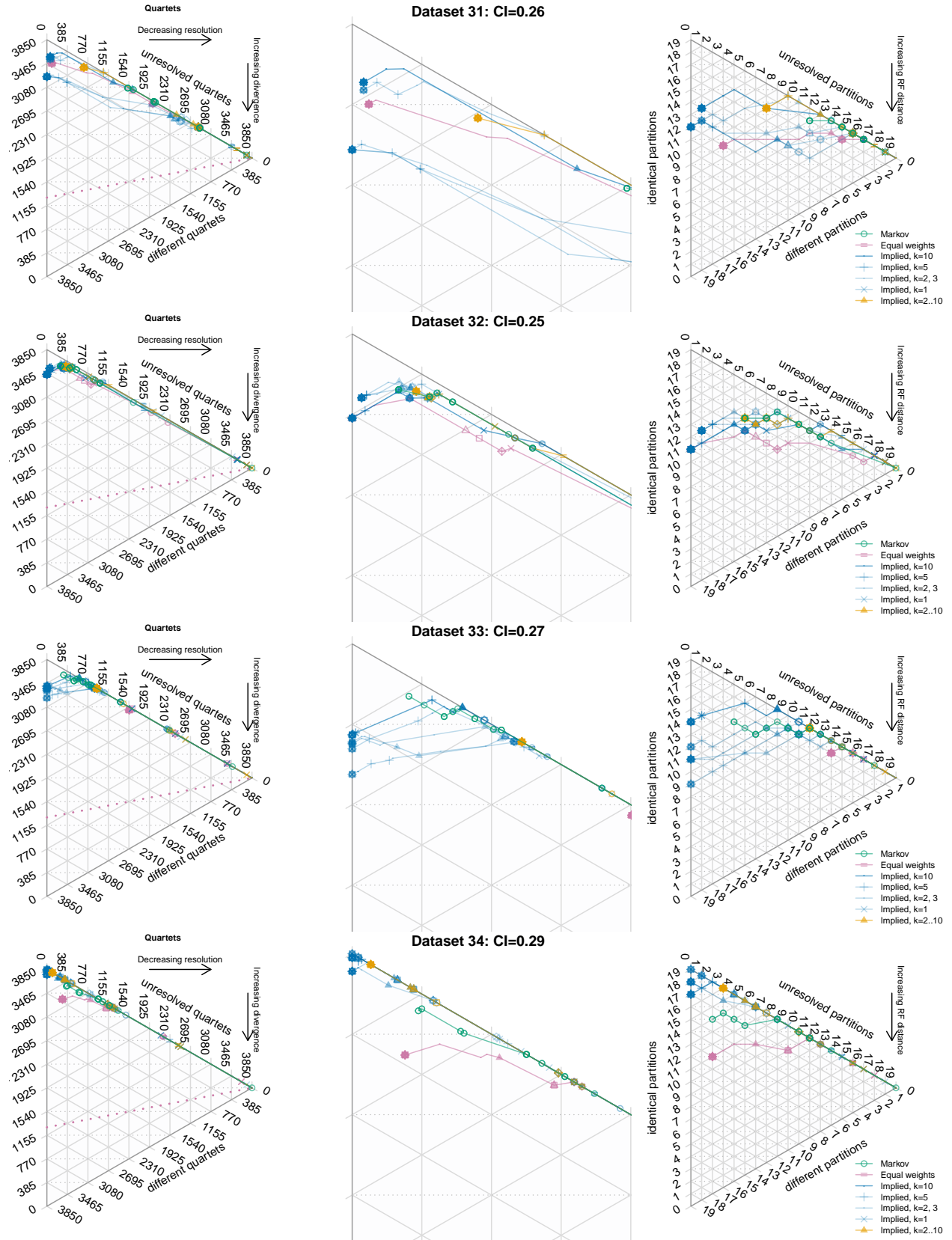Dataset 19: CI=0.3

Dataset 20: CI=0.25

## 0.4   Trees 21–30



**Quartets**

Decreasing resolution →

unresolved quartets

Increasing divergence

different quartets

**Dataset 21: CI=0.26**

unresolved partitions

Increasing RF distance

identical partitions

different partitions

○ Markov
■ Equal weights
— Implied, k=10
+ Implied, k=5
— Implied, k=2, 3
✕ Implied, k=1
▲ Implied, k=2..10

**Dataset 22: CI=0.26**

**Dataset 23: CI=0.25**

**Dataset 24: CI=0.23**
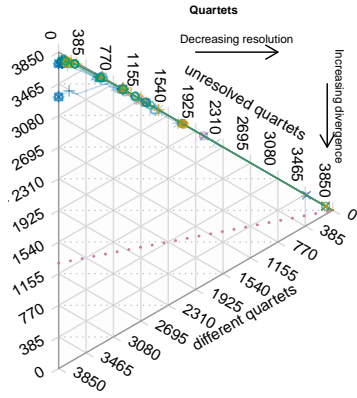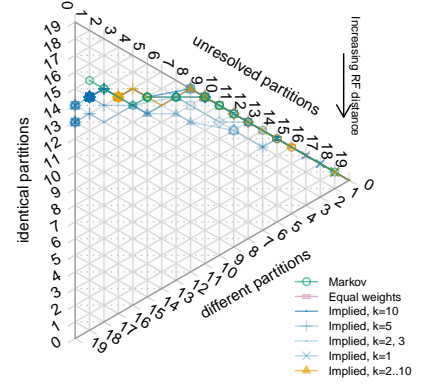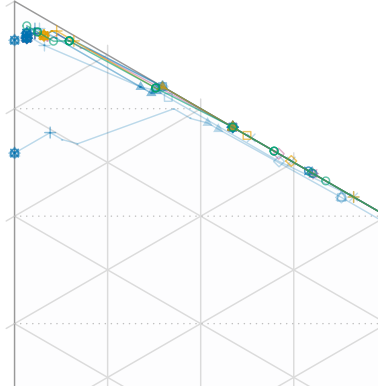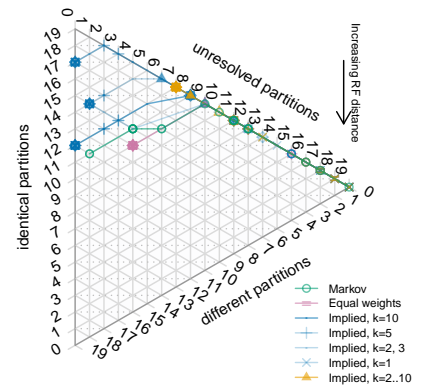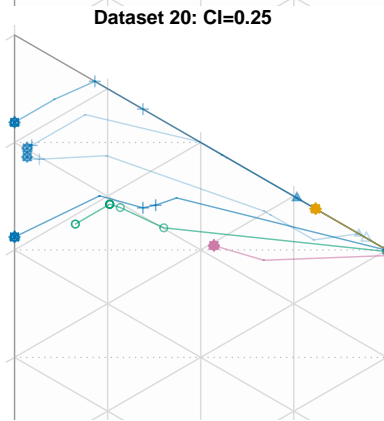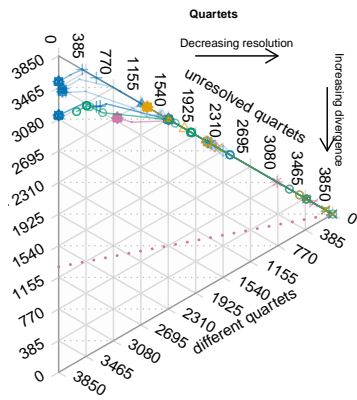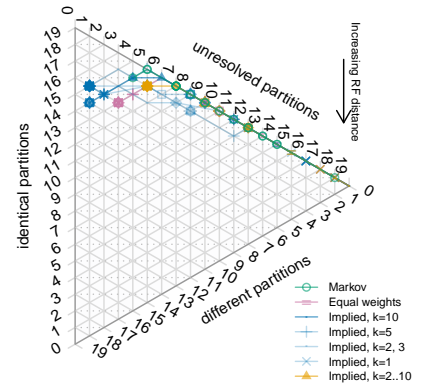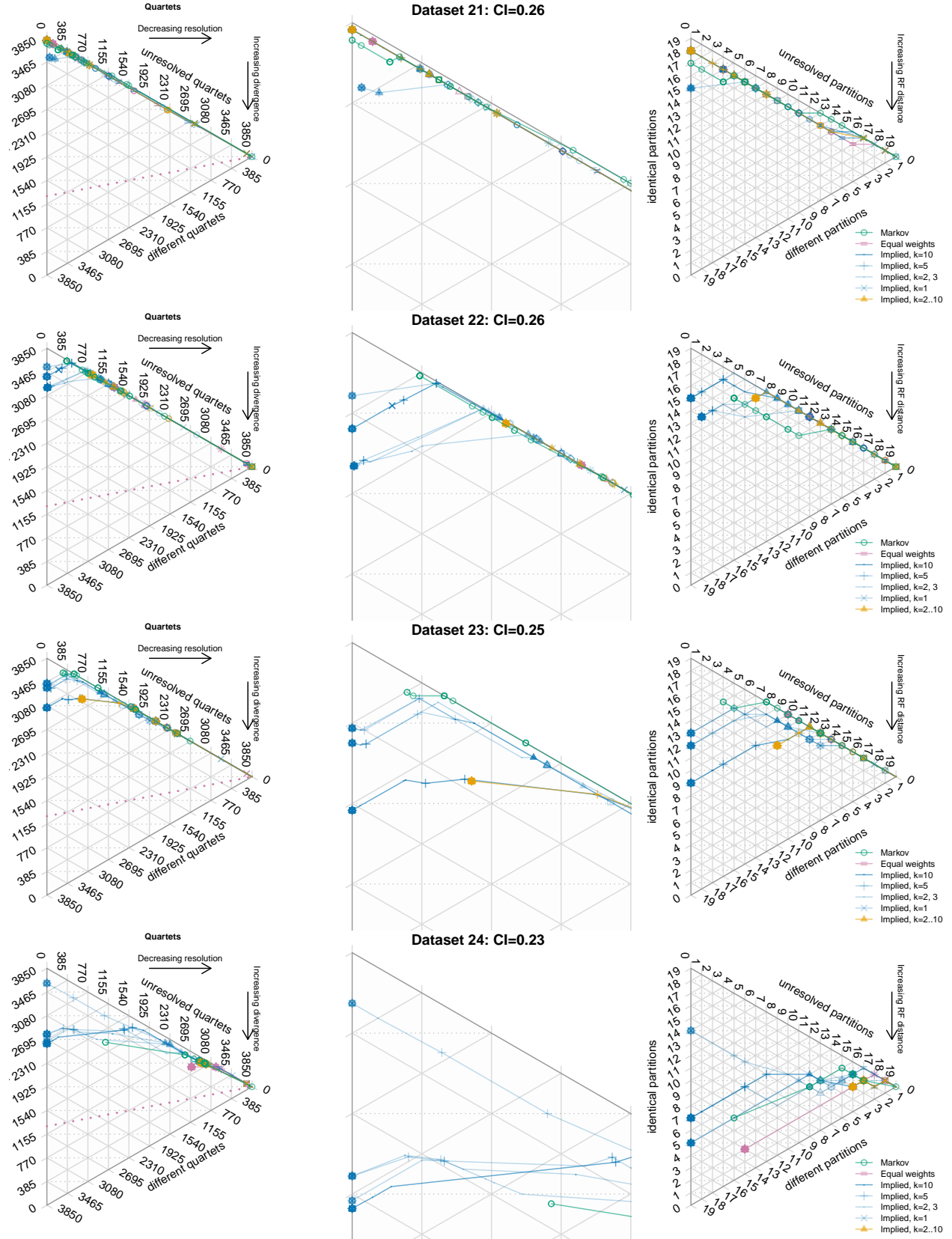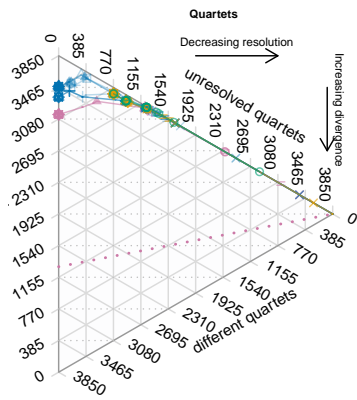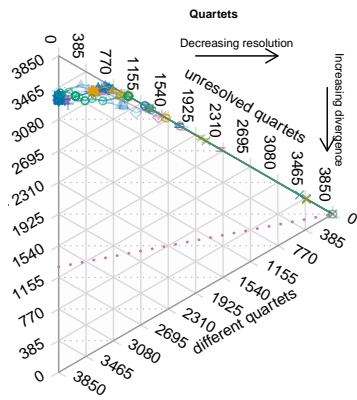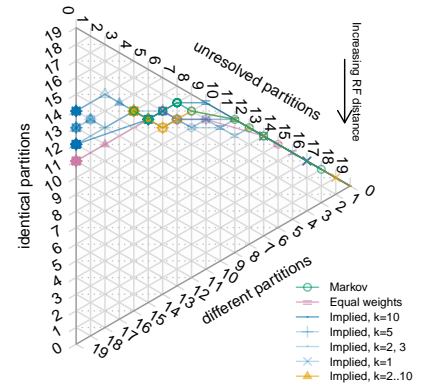
**Dataset 25: CI=0.28**
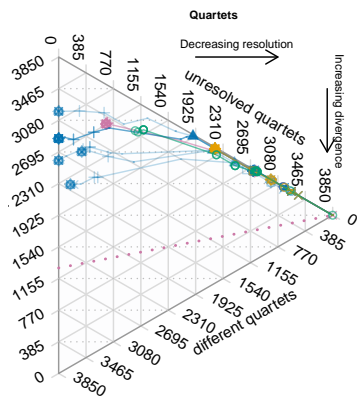
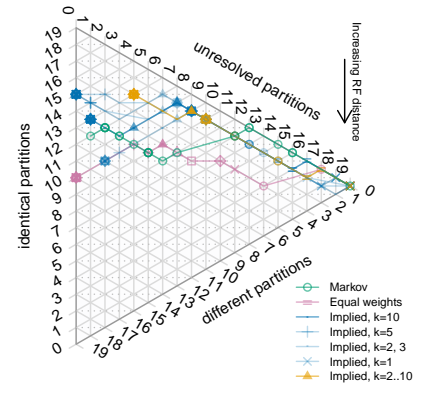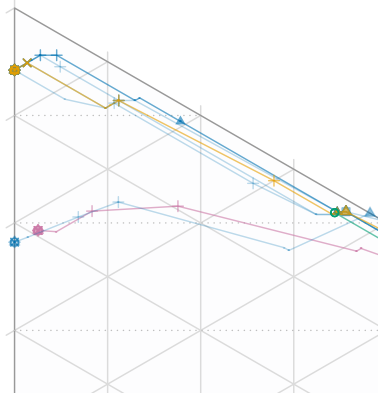**Dataset 26: CI=0.27**

**Dataset 27: CI=0.26**

**Dataset 28: CI=0.27**

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**Quartets**

Decreasing resolution →

**Dataset 29: CI=0.29**

Increasing RF distance →

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

**Quartets**

Decreasing resolution →

**Dataset 30: CI=0.25**

Increasing RF distance →

- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

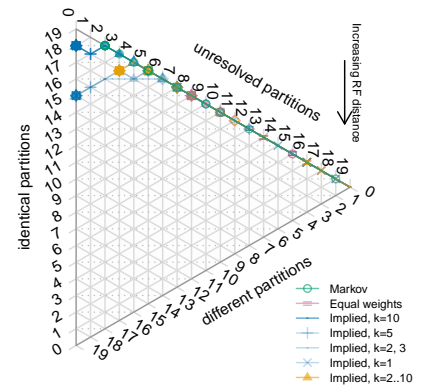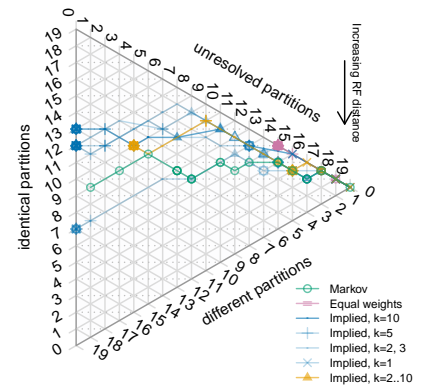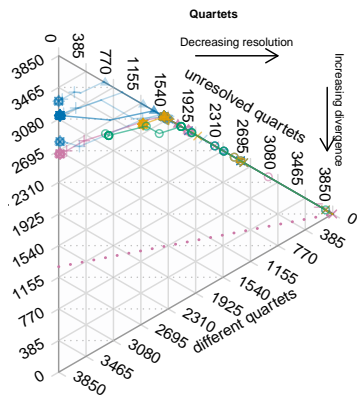Dataset 31: CI=0.26

Dataset 32: CI=0.25

Dataset 33: CI=0.27

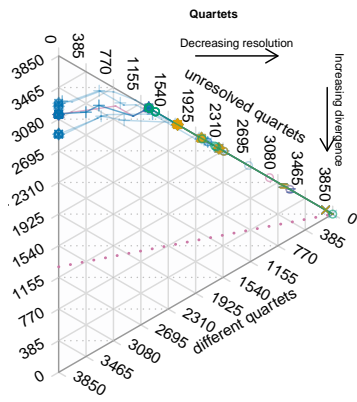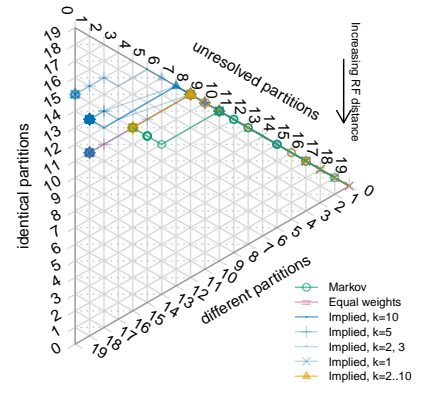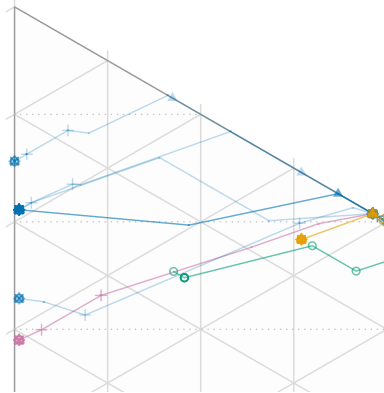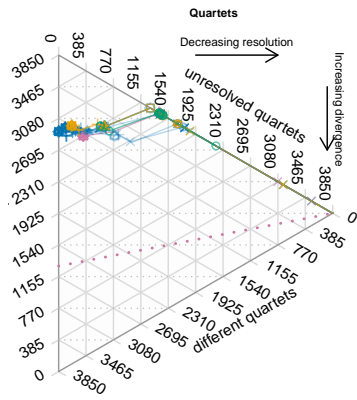Dataset 34: CI=0.29

Dataset 35: CI=0.25

Dataset 36: CI=0.24

Dataset 37: CI=0.26

Dataset 38: CI=0.29

Dataset 39: CI=0.25

Dataset 40: CI=0.24
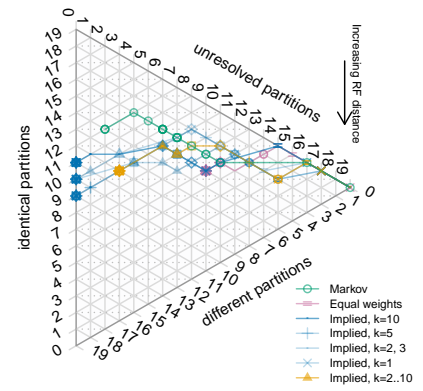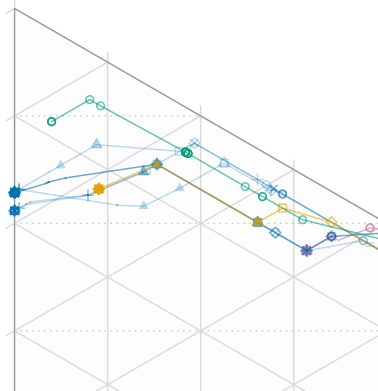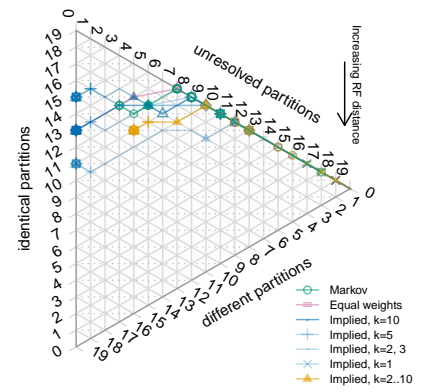
## 0.6   Trees 41–50



**Dataset 41: CI=0.3**



**Dataset 42: CI=0.24**



**Dataset 43: CI=0.27**
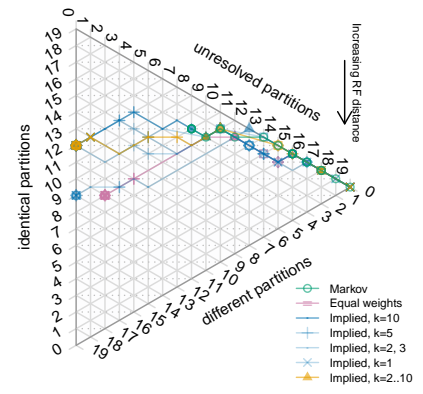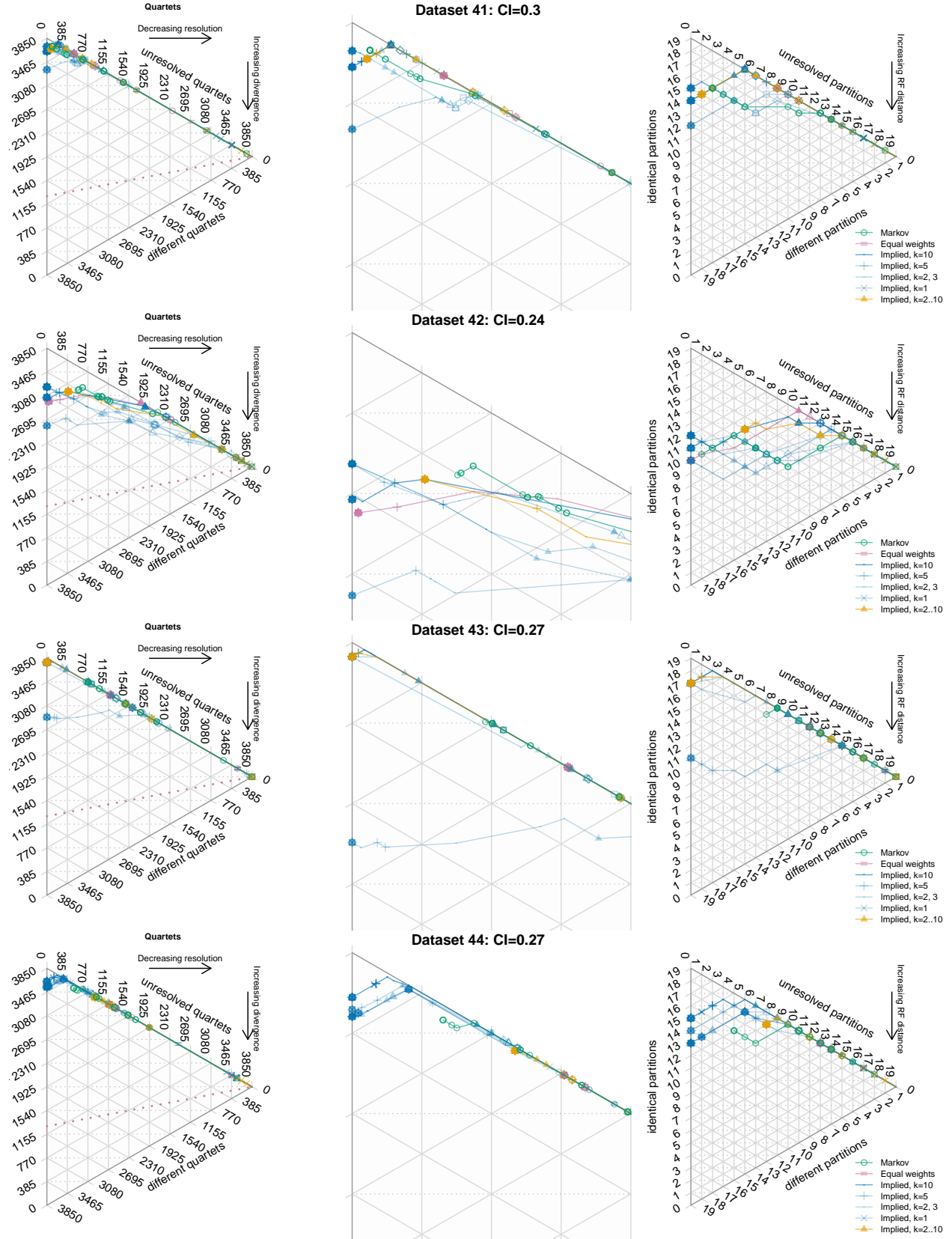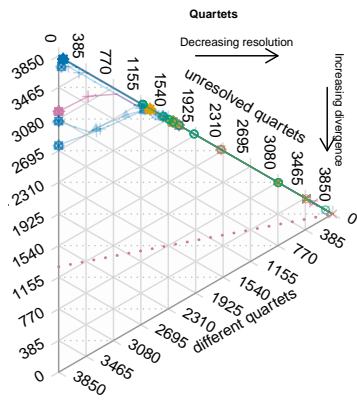


**Dataset 44: CI=0.27**
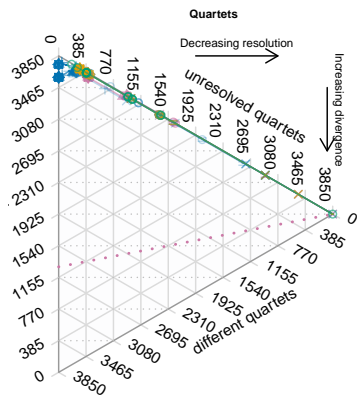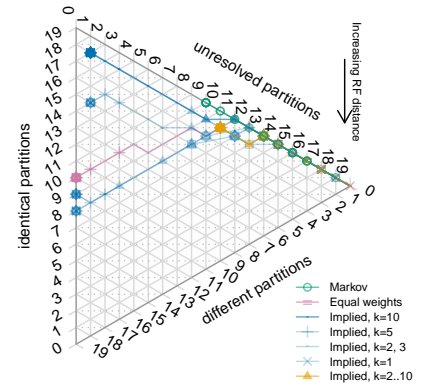
**Dataset 45: CI=0.27**

**Dataset 46: CI=0.24**
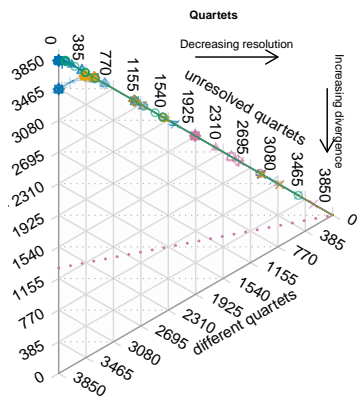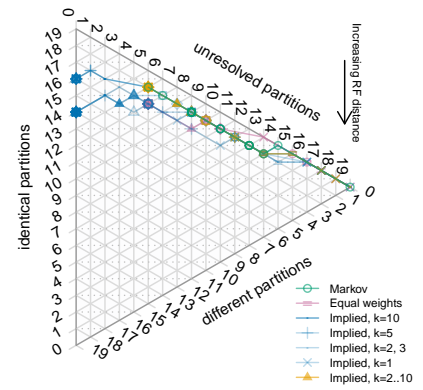
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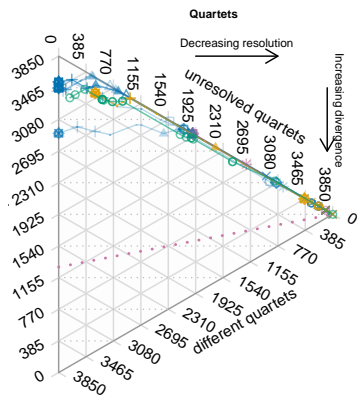
**Dataset 48: CI=0.27**

**Dataset 49: CI=0.28**

**Dataset 50: CI=0.25**
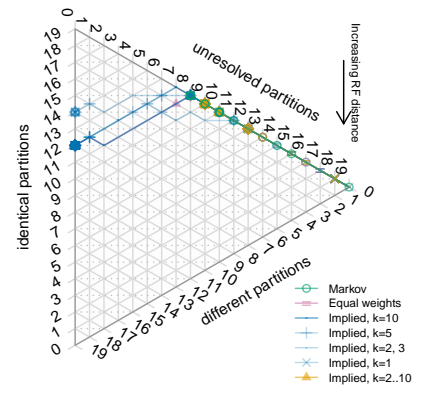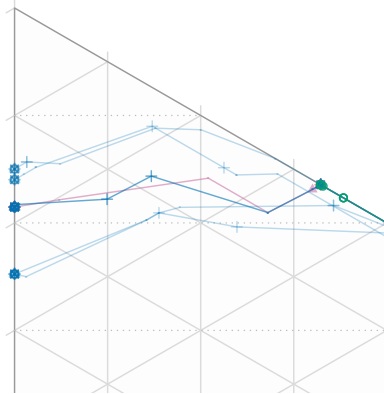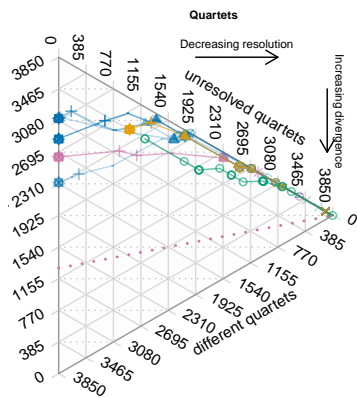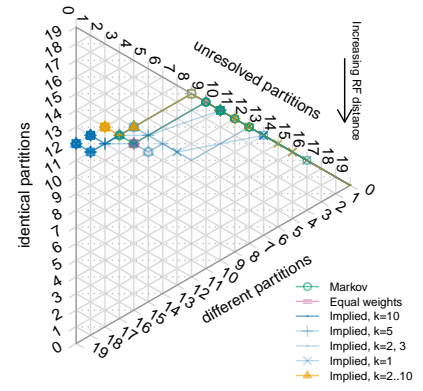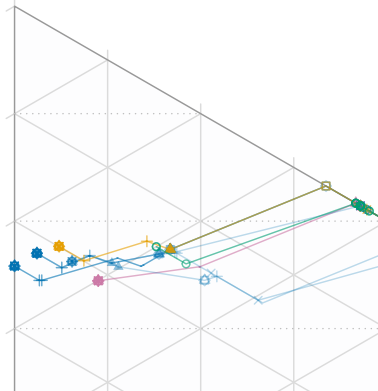
**Dataset 51: CI=0.3**

**Dataset 52: CI=0.25**
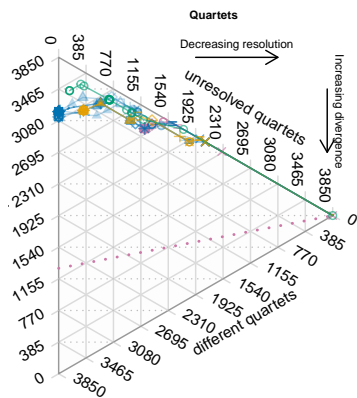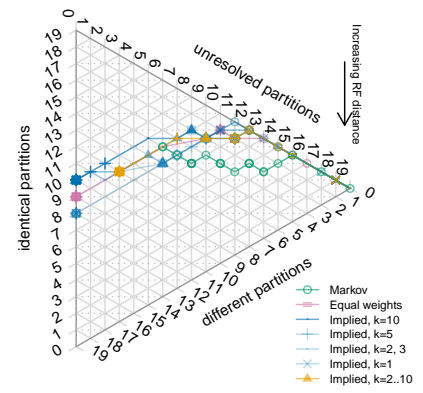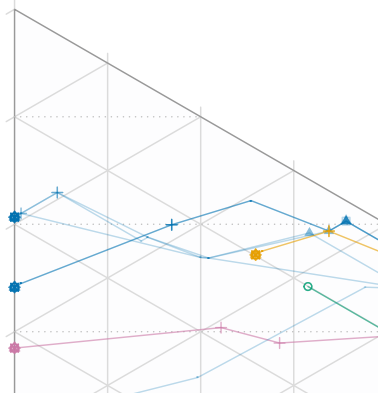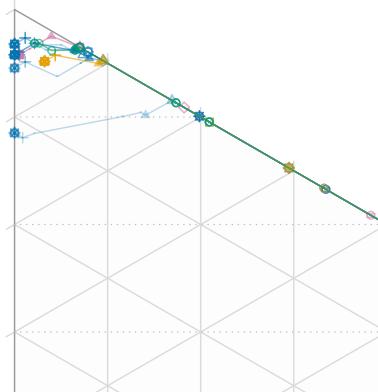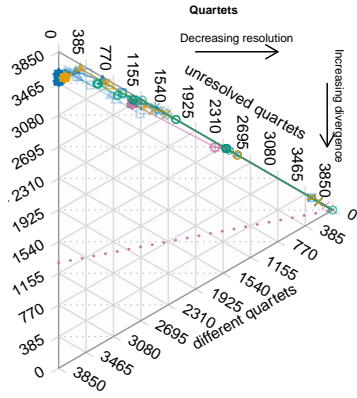
**Dataset 53: CI=0.25**
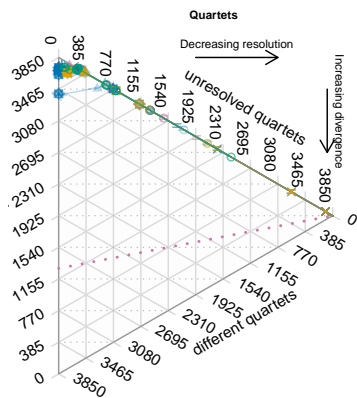
**Dataset 54: CI=0.28**

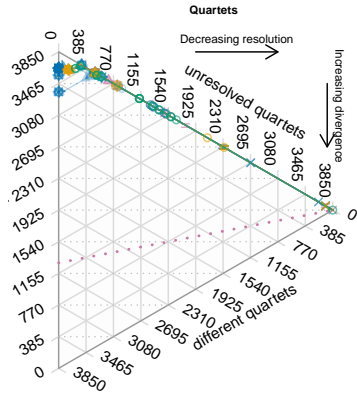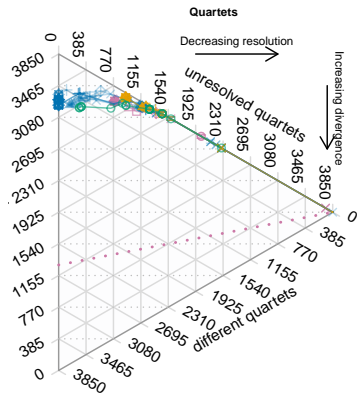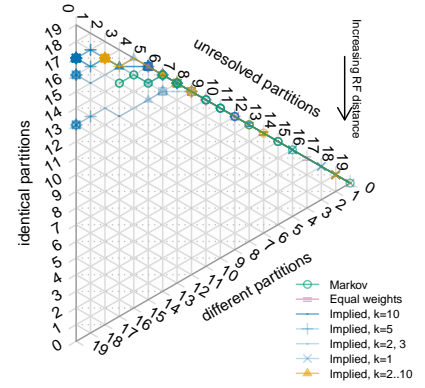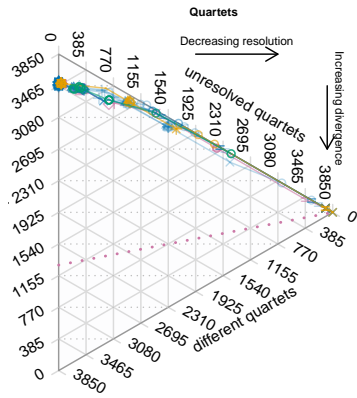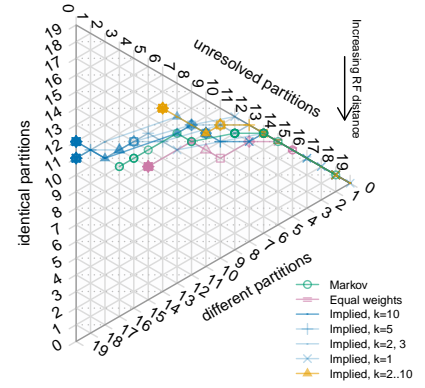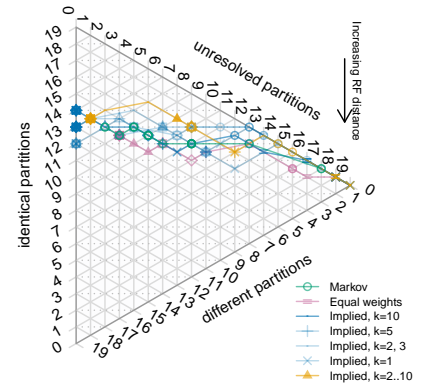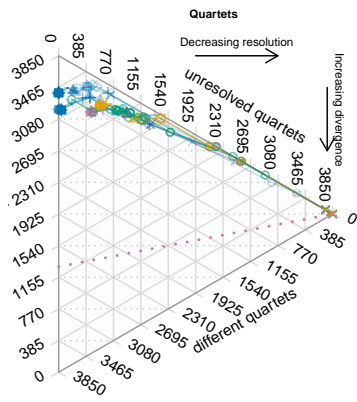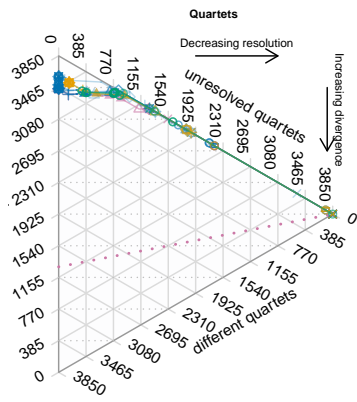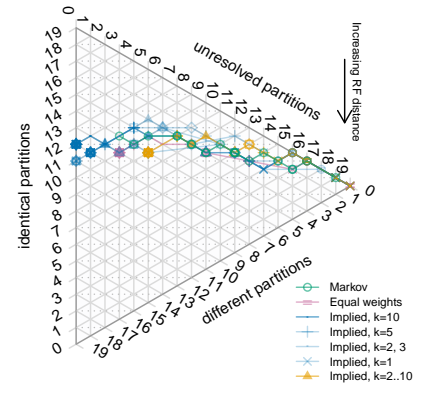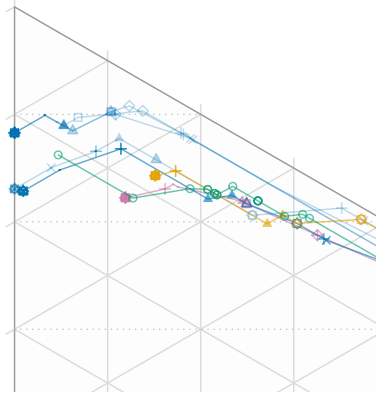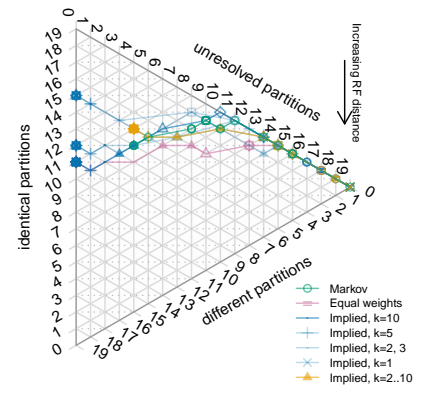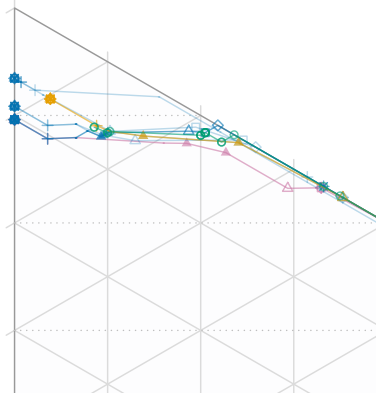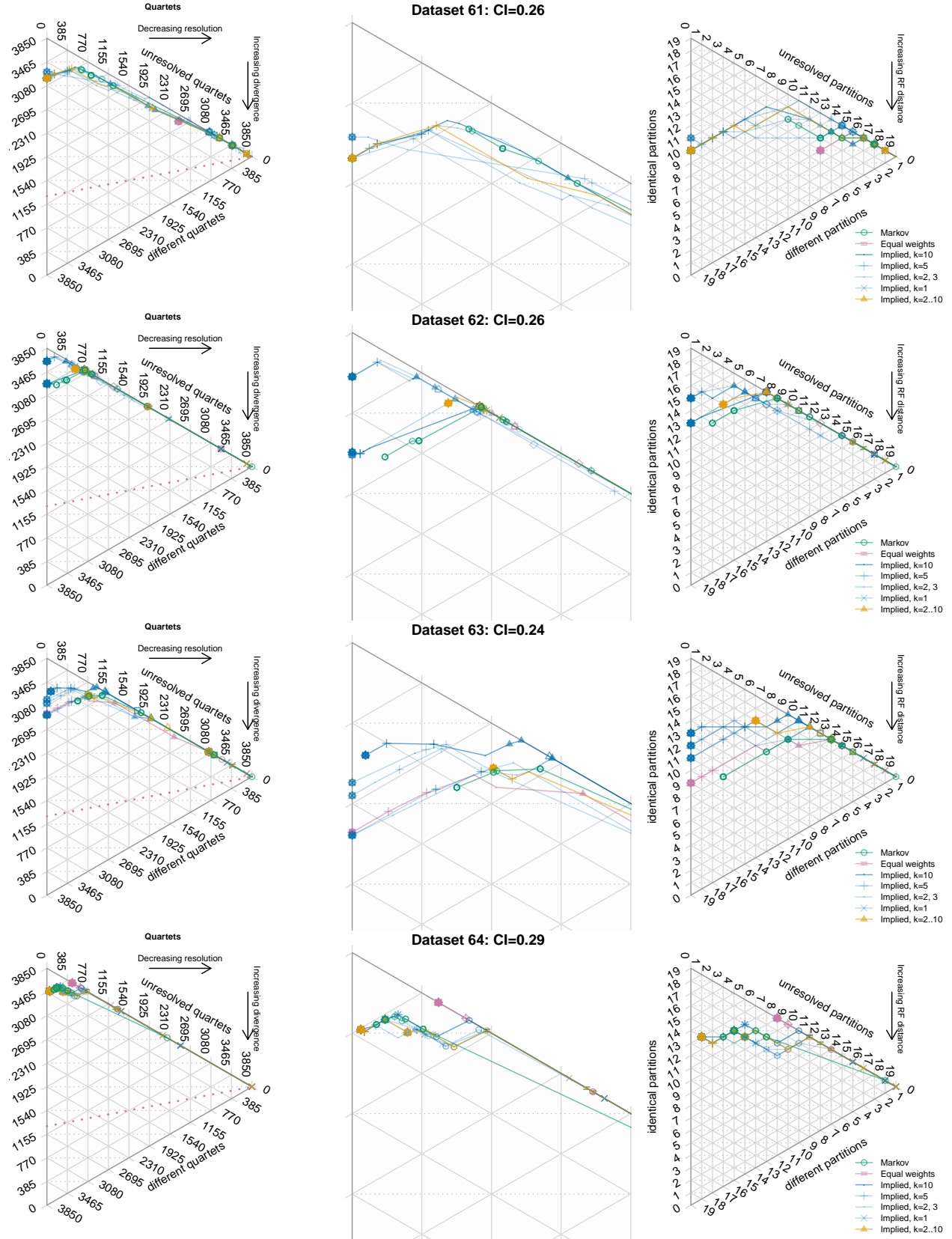Dataset 55: CI=0.28
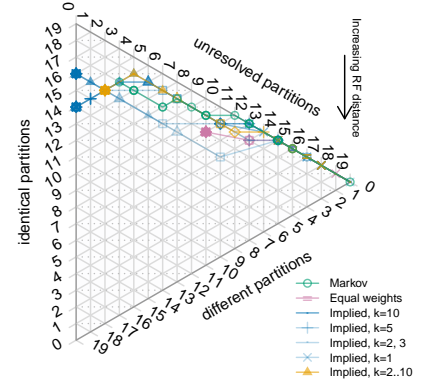
Dataset 56: CI=0.31

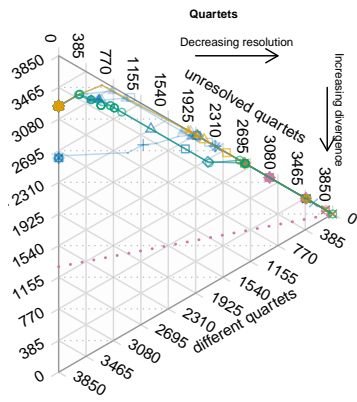Dataset 57: CI=0.25

Dataset 58: CI=0.25

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**Dataset 59: CI=0.26**

**Dataset 60: CI=0.24**

## 0.8   Trees 61–70



**Dataset 61: CI=0.26**

**Dataset 62: CI=0.26**

**Dataset 63: CI=0.24**

**Dataset 64: CI=0.29**

Quartets

Dataset 65: CI=0.25

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

Quartets

Dataset 66: CI=0.27

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

Quartets
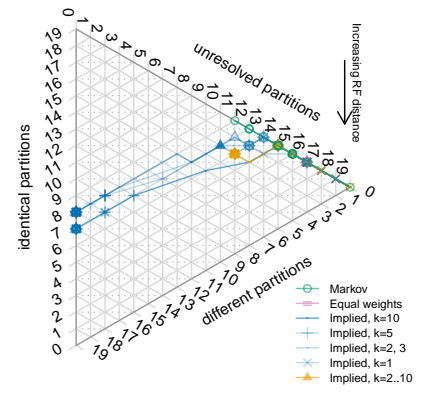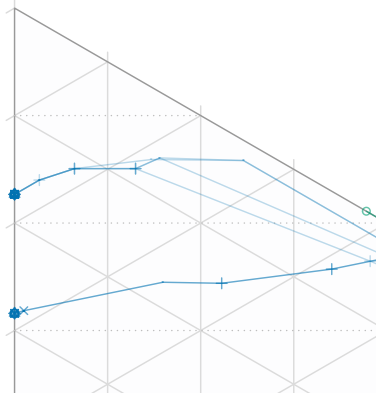
Dataset 67: CI=0.26

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

Quartets

Dataset 68: CI=0.31

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

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**Dataset 69: CI=0.27**

**Dataset 70: CI=0.27**

Markov
Equal weights
Implied, k=10
Implied, k=5
Implied, k=2, 3
Implied, k=1
Implied, k=2..10

**Dataset 71: CI=0.27**

**Dataset 72: CI=0.29**

**Dataset 73: CI=0.28**

**Dataset 74: CI=0.28**

**Dataset 75: CI=0.24**

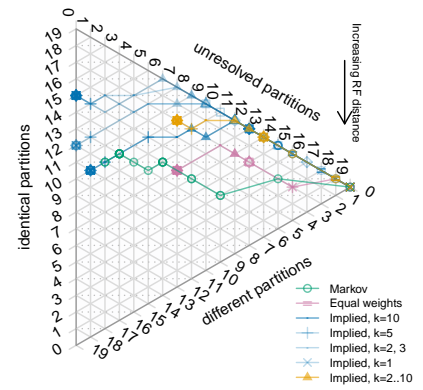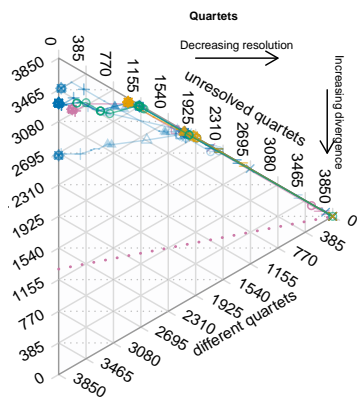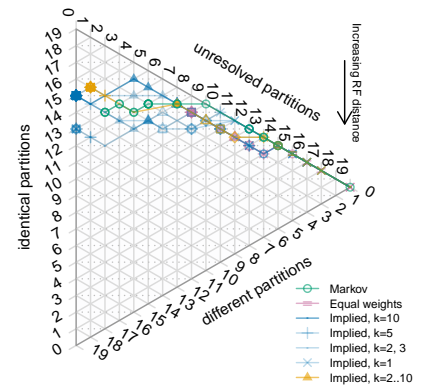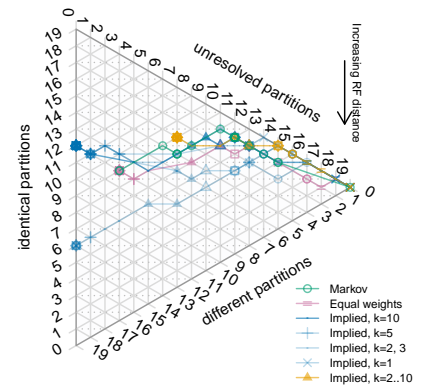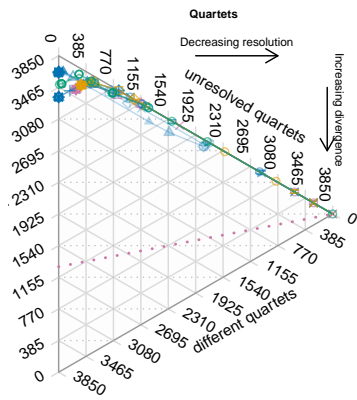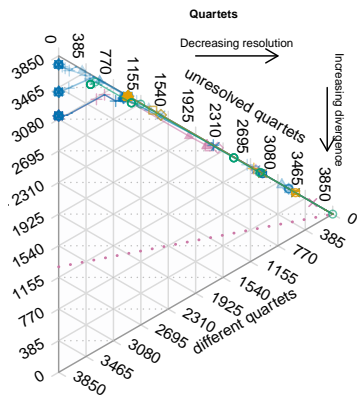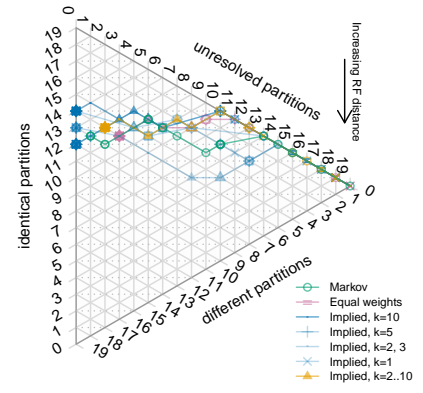**Dataset 76: CI=0.26**
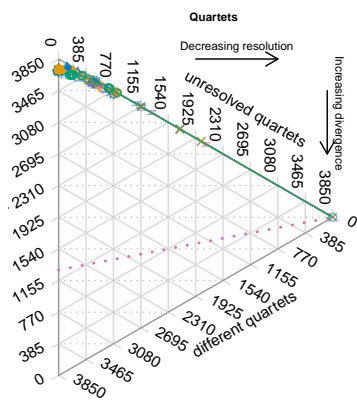
**Dataset 77: CI=0.28**

**Dataset 78: CI=0.24**

Legend for each right-column panel:
- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

**Dataset 79: CI=0.24**

**Dataset 80: CI=0.27**

Legend:
- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

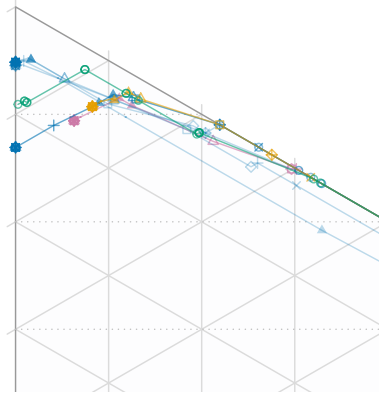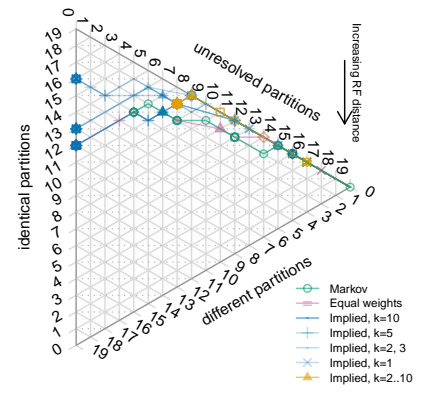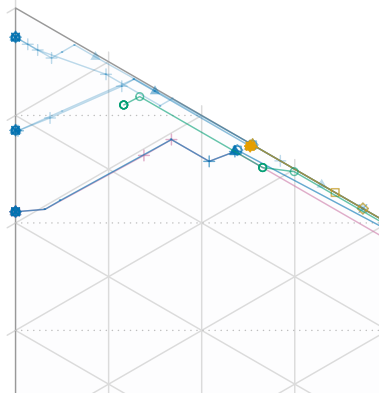## Dataset 81: CI=0.27

## Dataset 82: CI=0.28

## Dataset 83: CI=0.25
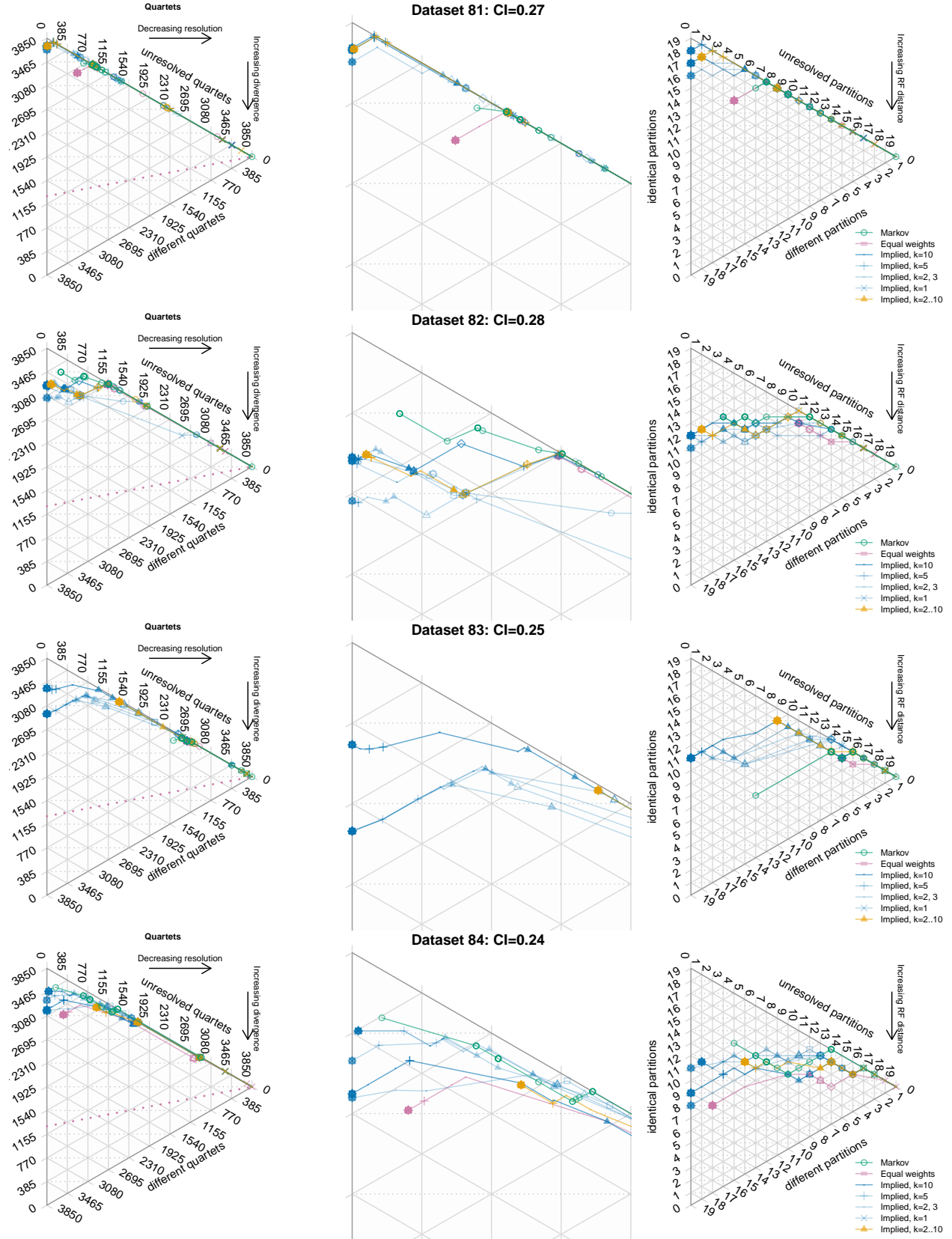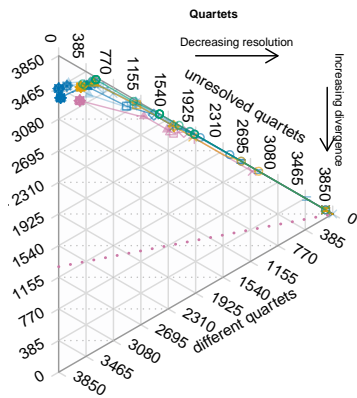
## Dataset 84: CI=0.24
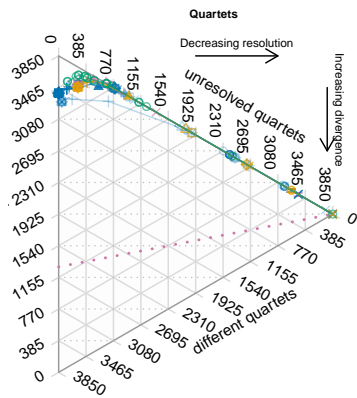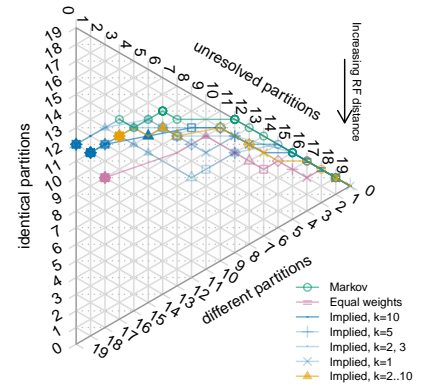
**Dataset 85: CI=0.27**

**Dataset 86: CI=0.27**
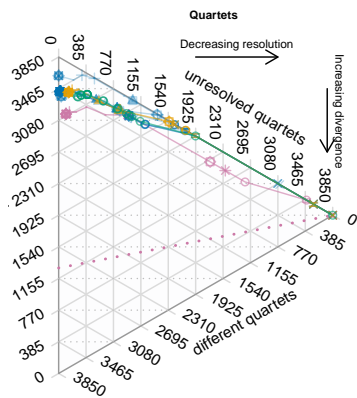
**Dataset 87: CI=0.23**

**Dataset 88: CI=0.25**

Legend (repeated in each right-hand panel):
- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10

Dataset 89: CI=0.27
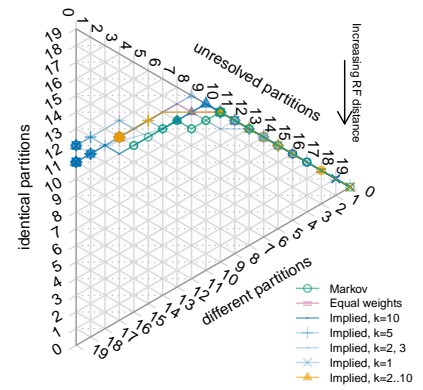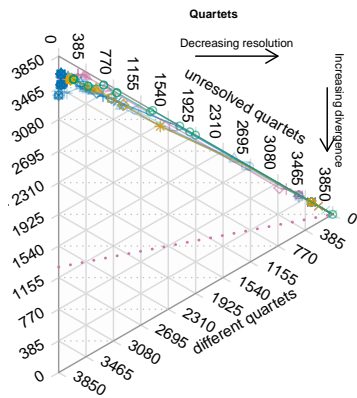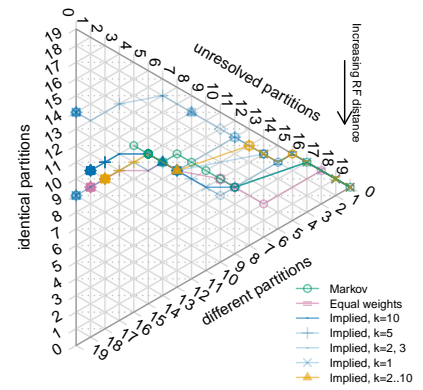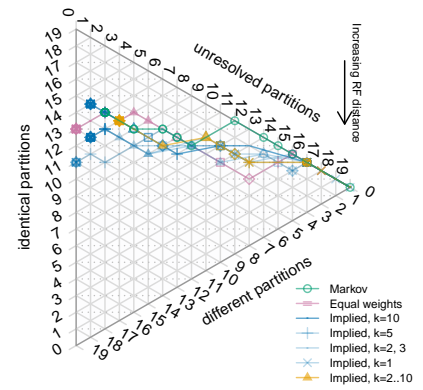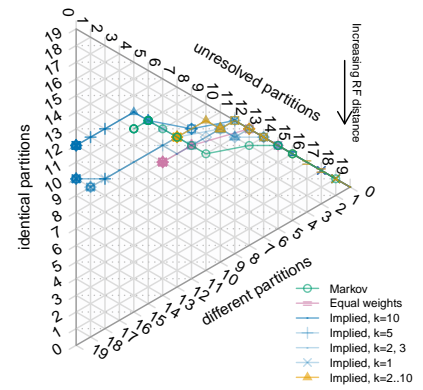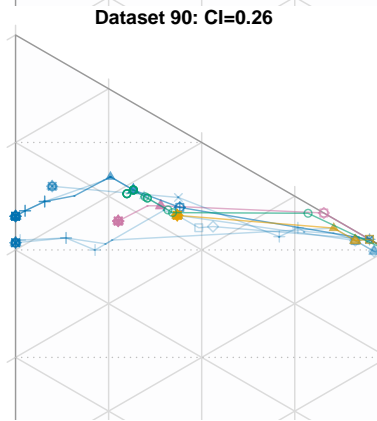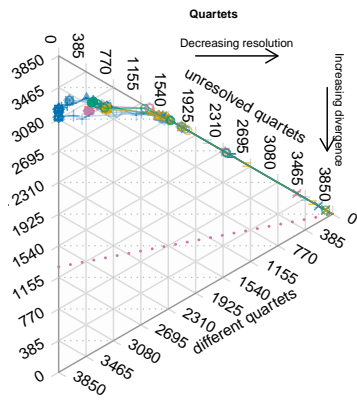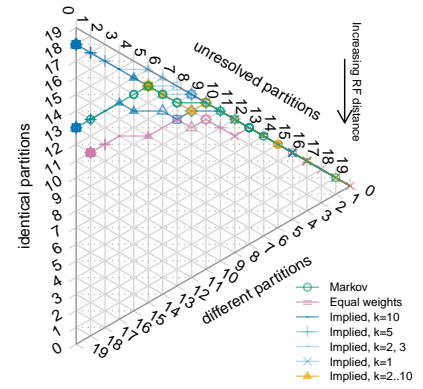


Dataset 90: CI=0.26

## 0.11 Trees 91–100



Dataset 91: CI=0.26

Dataset 92: CI=0.25

Dataset 93: CI=0.28

Dataset 94: CI=0.24

Legend (repeated):
- Markov
- Equal weights
- Implied, k=10
- Implied, k=5
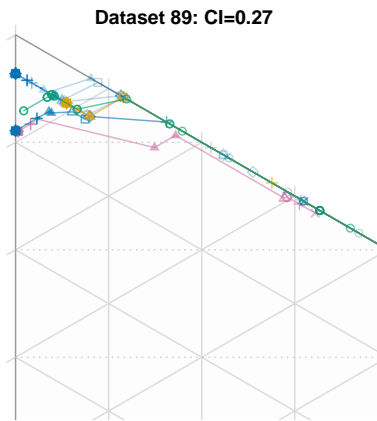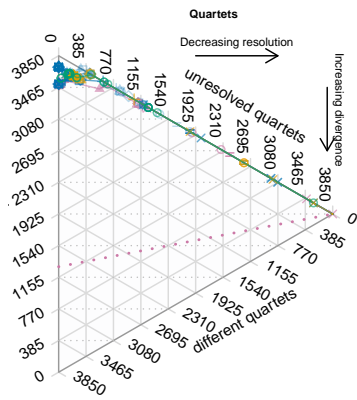- Implied, k=2, 3
- Implied, k=1
- Implied, k=2..10
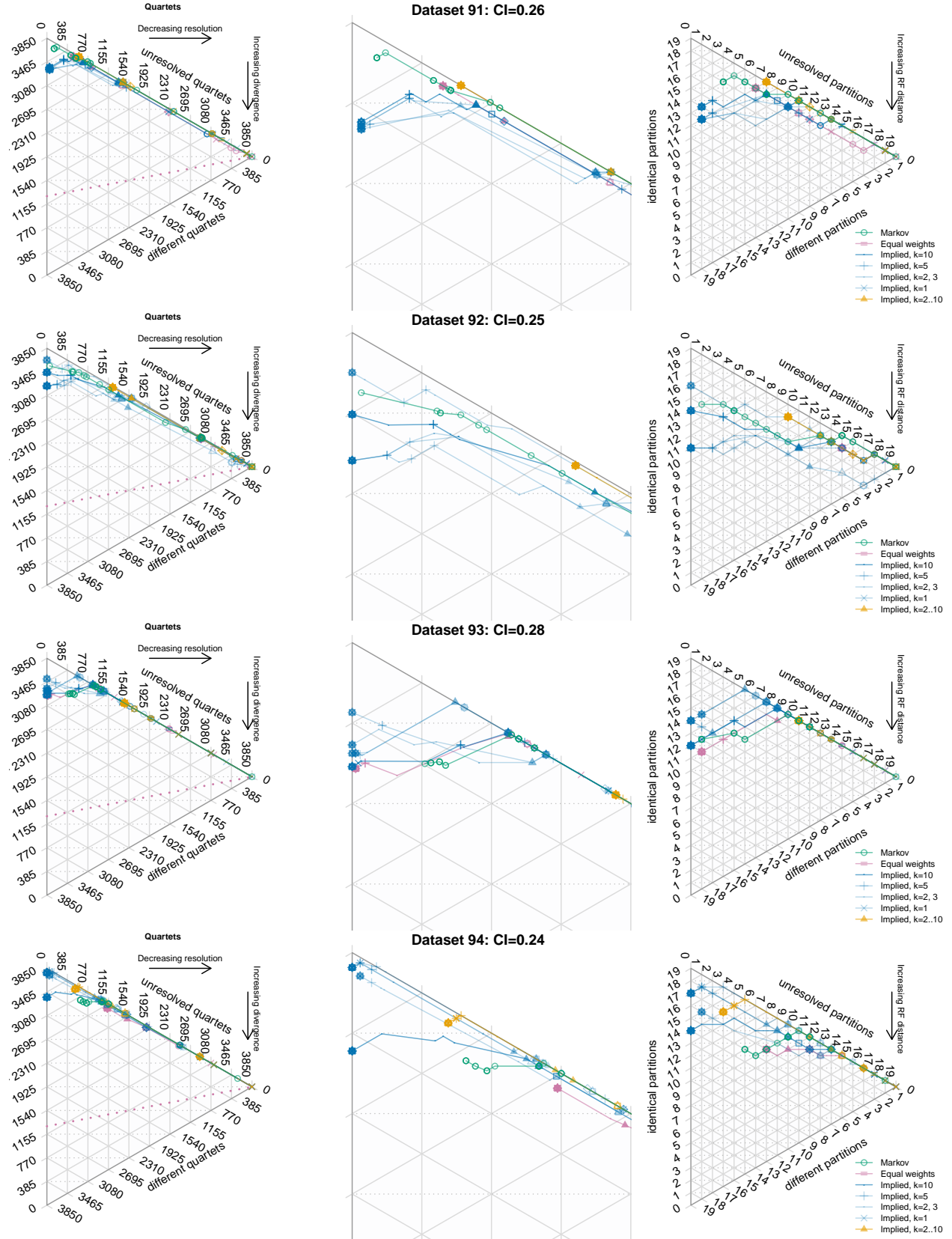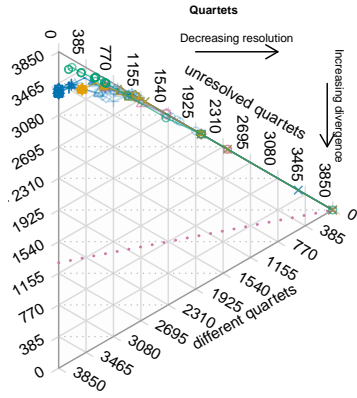
Dataset 95: CI=0.24
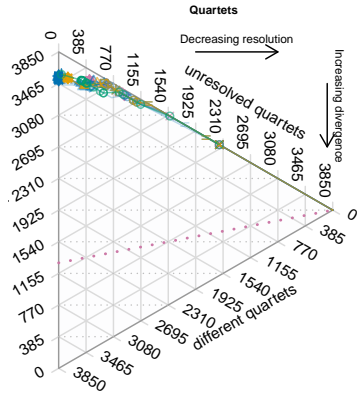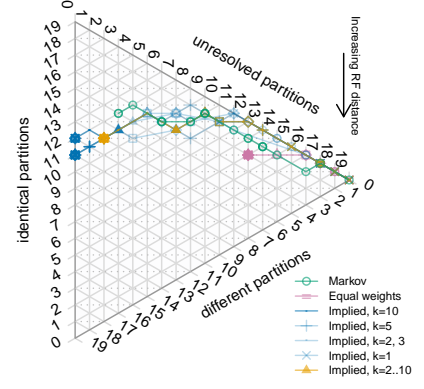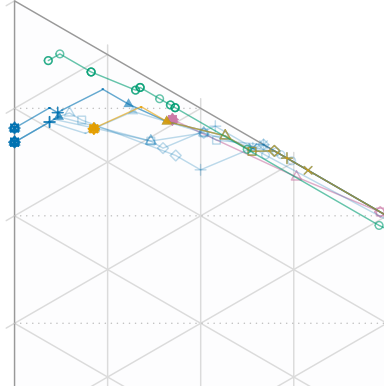
Dataset 96: CI=0.26
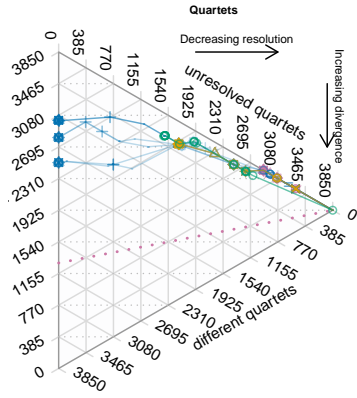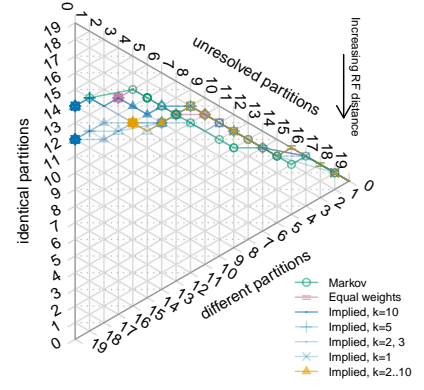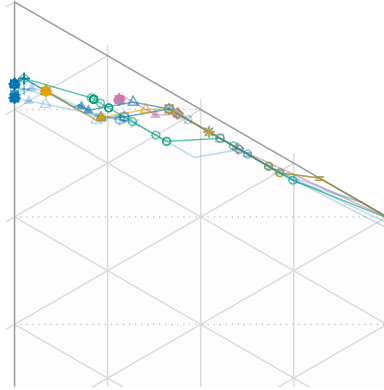
Dataset 97: CI=0.27
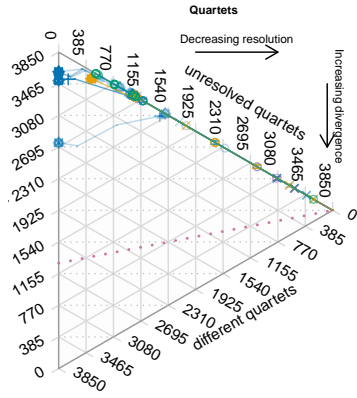
Dataset 98: CI=0.26

## References

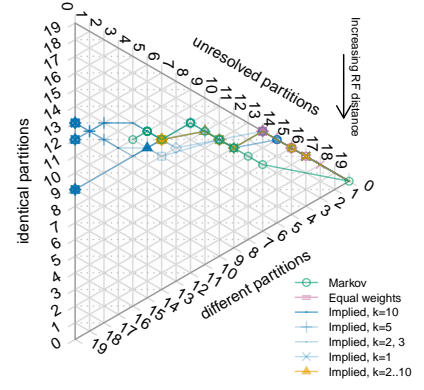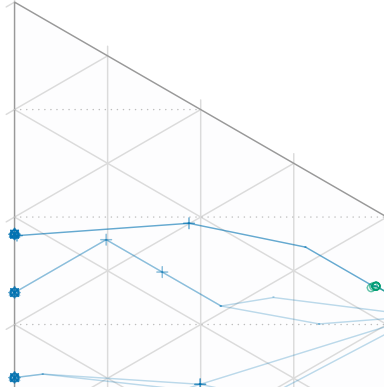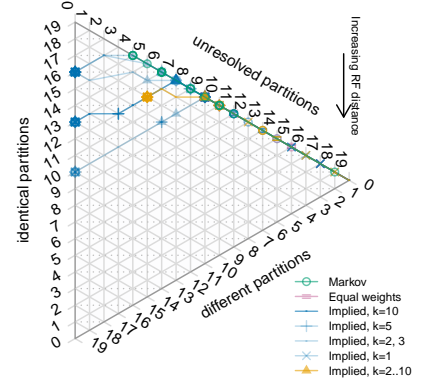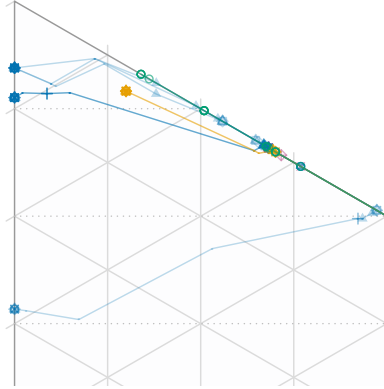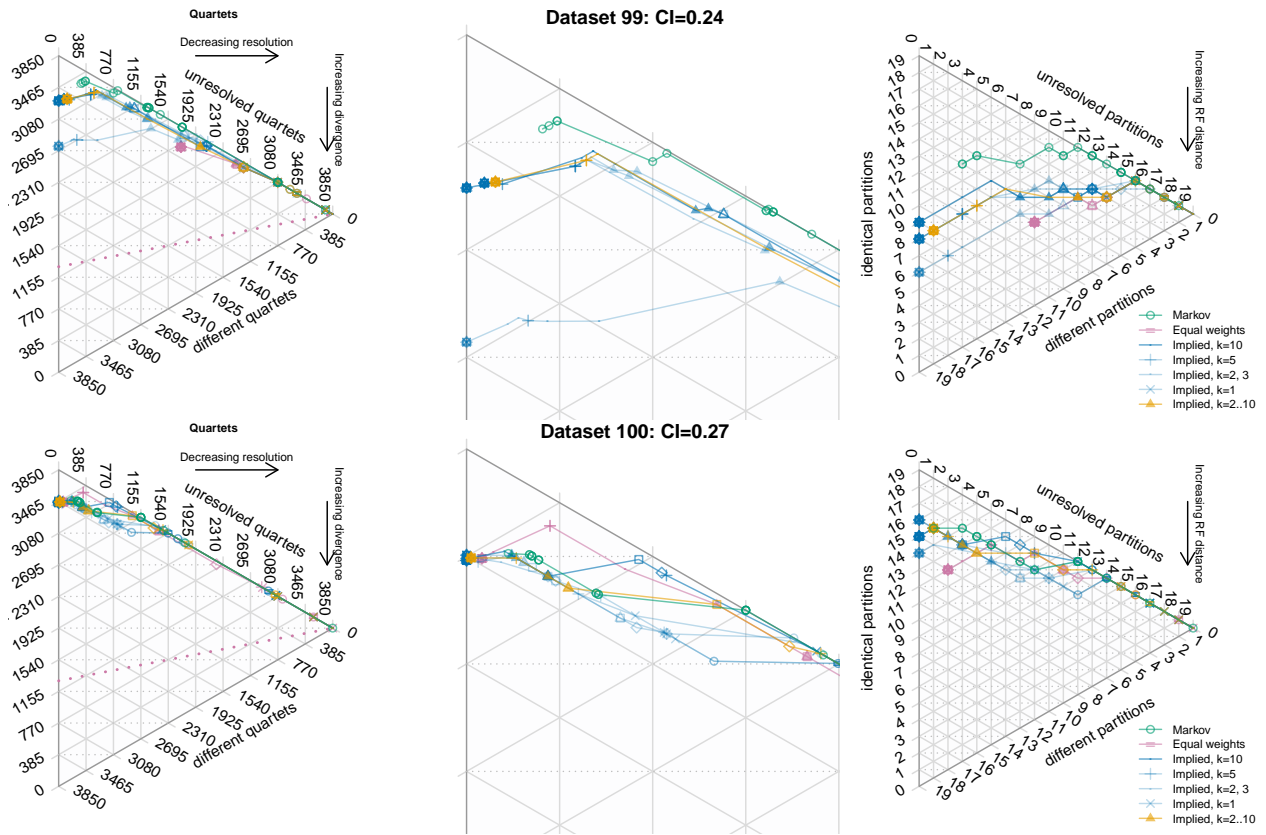1. Congreve CR, Lamsdell JC. 2016 Implied weighting and its utility in palaeontological datasets: a study using modelled phylogenetic matrices. *Palaeontology* **59**, 447–465. (doi:10.1111/pala.12236)

2. Smith MR. 2019 Bayesian and parsimony approaches reconstruct informative trees from simulated morphological datasets. *Biology Letters* **15**, 20180632. (doi:10.1098/rsbl.2018.0632)