

# Advantages of Dynamic Time Warping window function in automated correlation of stratigraphic time series

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## Study Area

- IODP Sites (e.g. U1463)
- ODP Sites (e.g. 765)
- Industrial Sites (e.g. Picard-1, Bounty-1, Minilya-1)

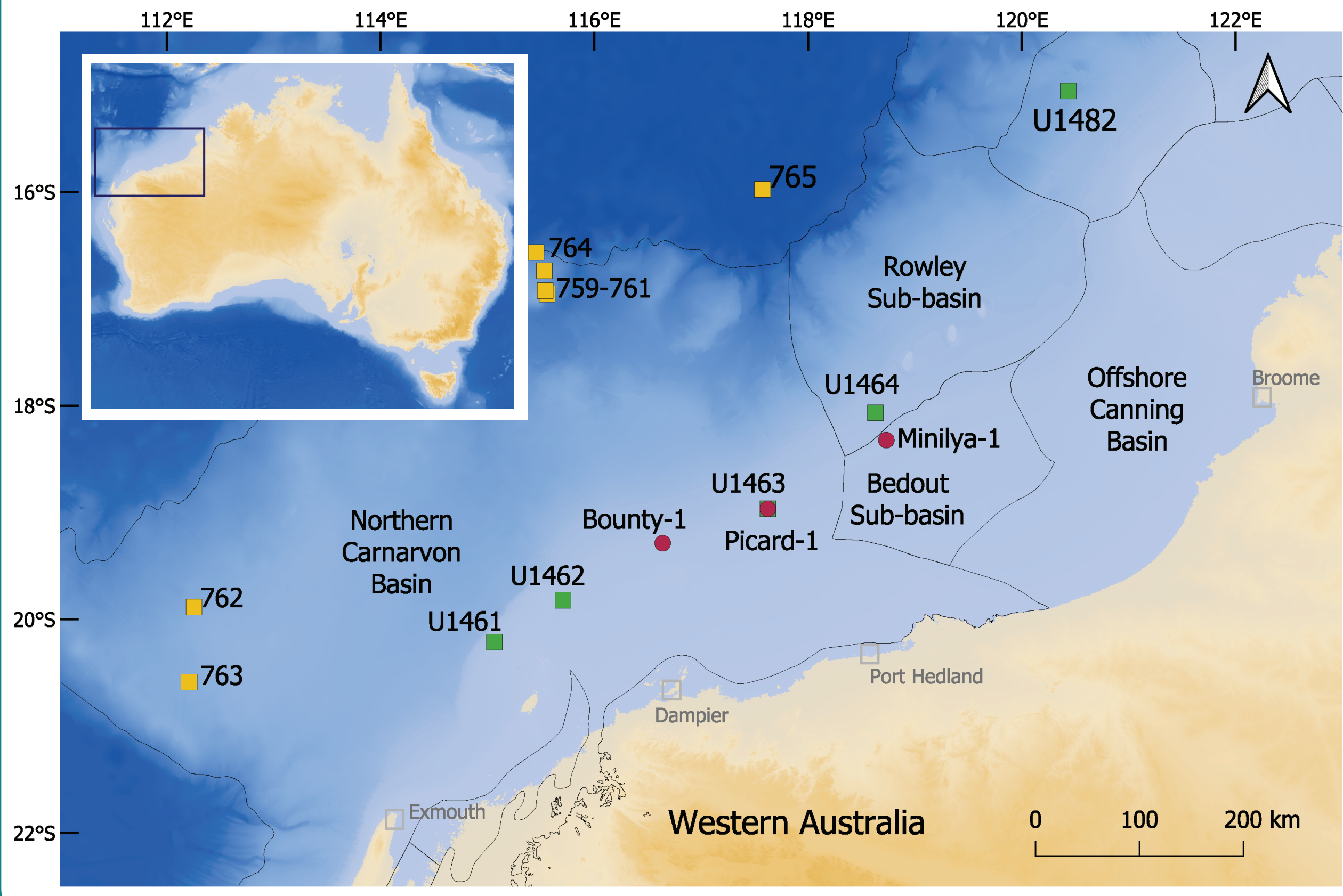
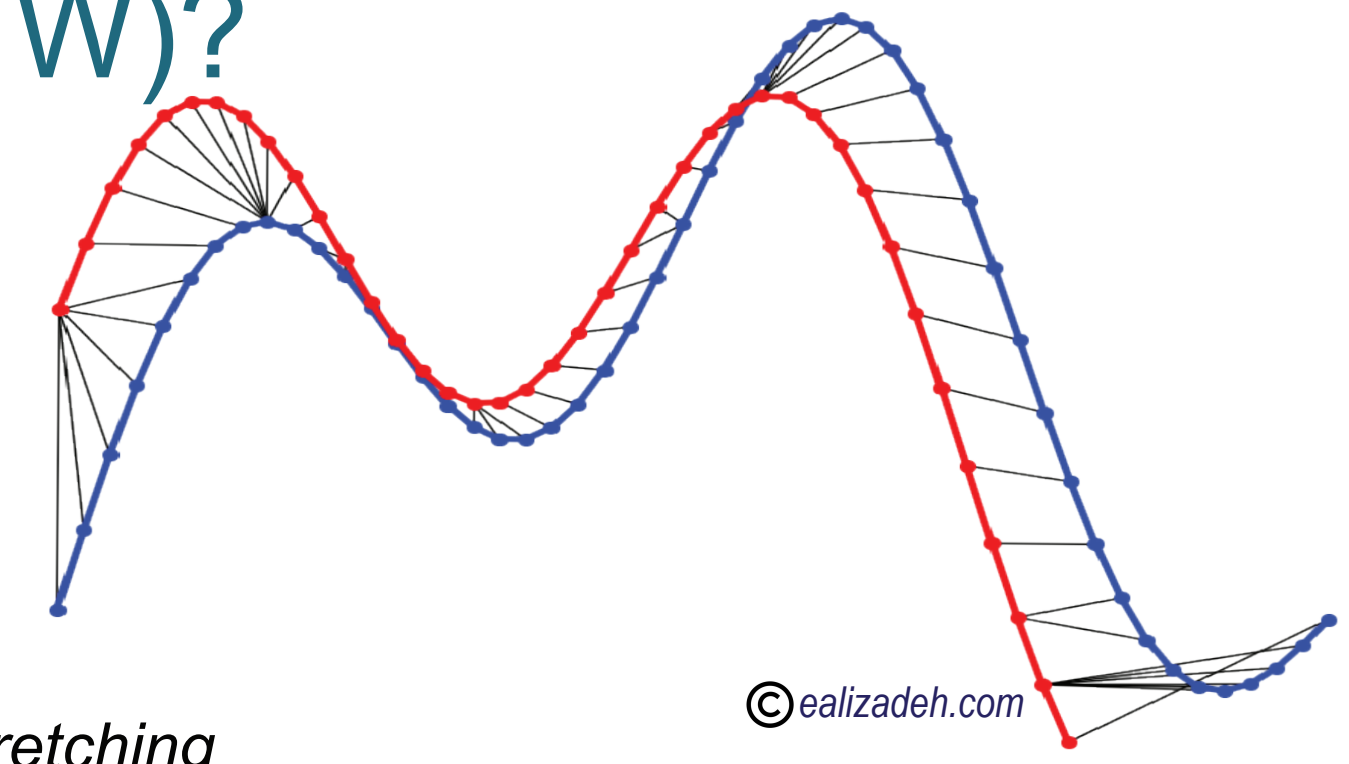


Table 1: U1463 datums and their approximate position at three industrial sites

DATUM	STRATIGRAPHIC DEPTH POSITION (METERS)		
	PICARD-1	BOUNTY-1	MINILYA-1
Top <i>G. fistulosus</i>	370	375	320
Base <i>G. crassaformis</i>	430	460	365
Manual Datum	545	630	480
Manual Datum	1010	1275	810
Manual Datum	1190	-	940

## What is Dynamic Time Warping (DTW)?

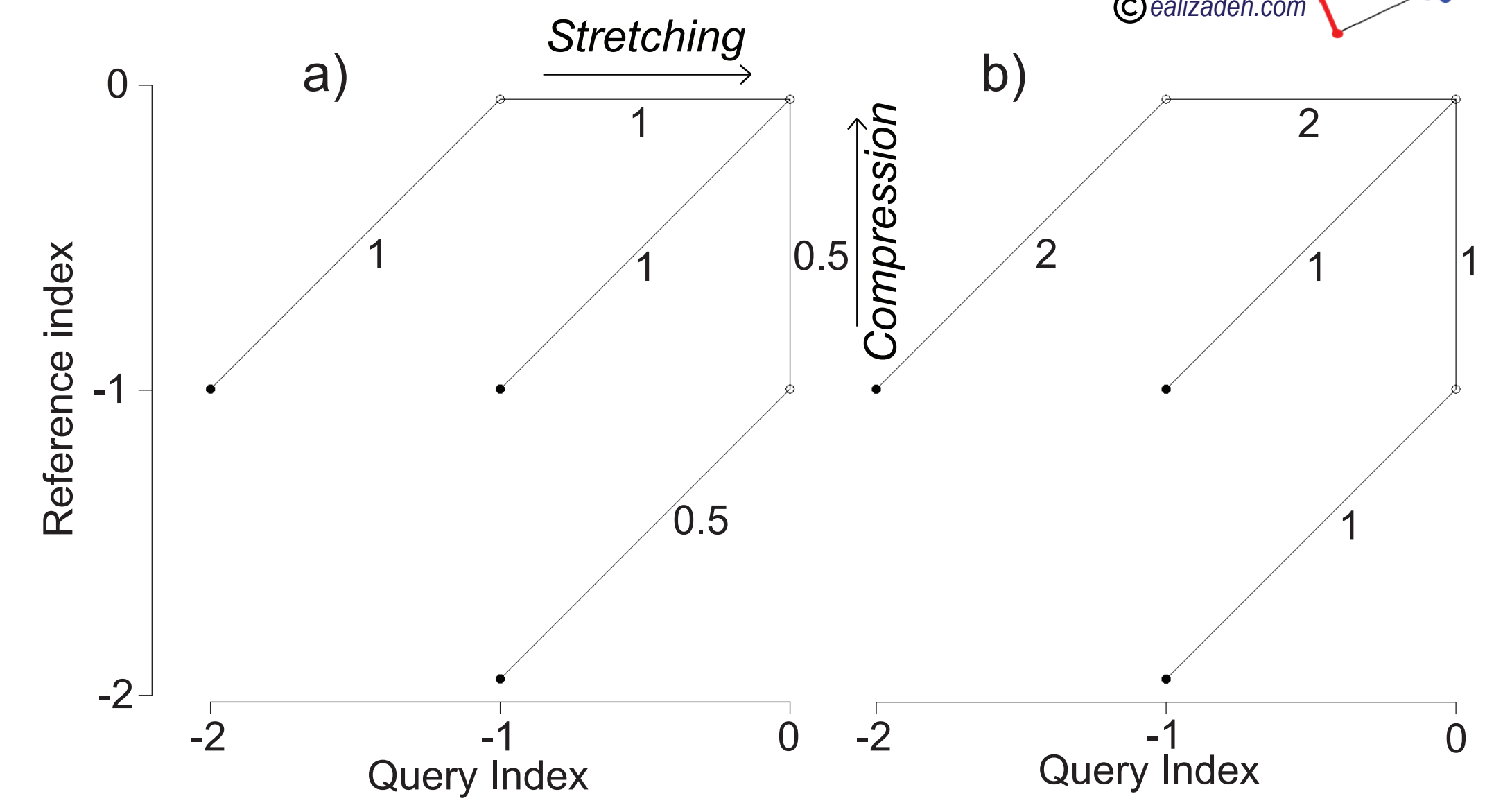
- Aligns two sequences by stretching or compressing locally
- Method to calculate optimal matching
- Powerful for finding patterns in sequential data
- Applications: speech recognition, financial markets, bioinformatics, stratigraphy



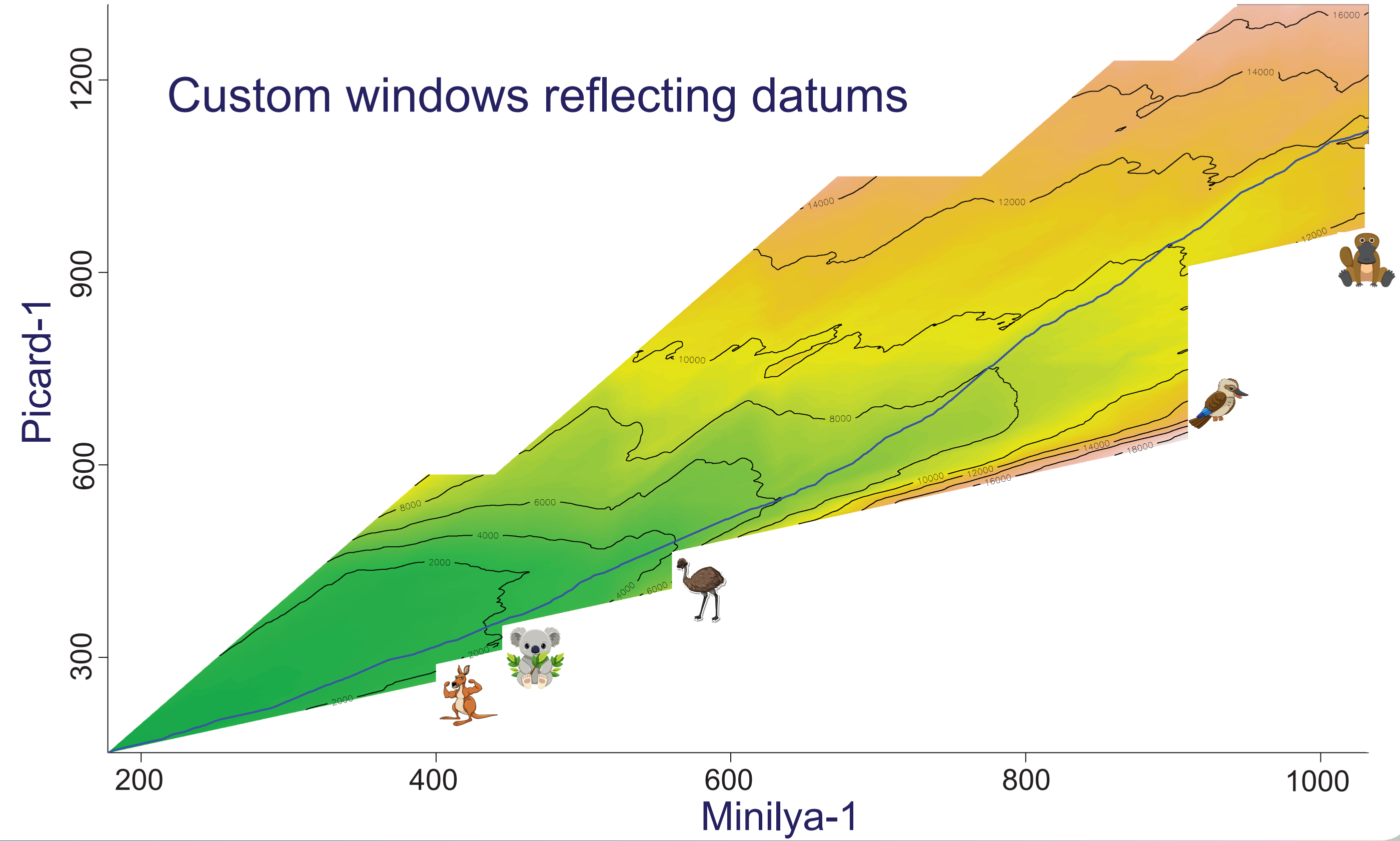
## Step Pattern

a) asymmetricP1

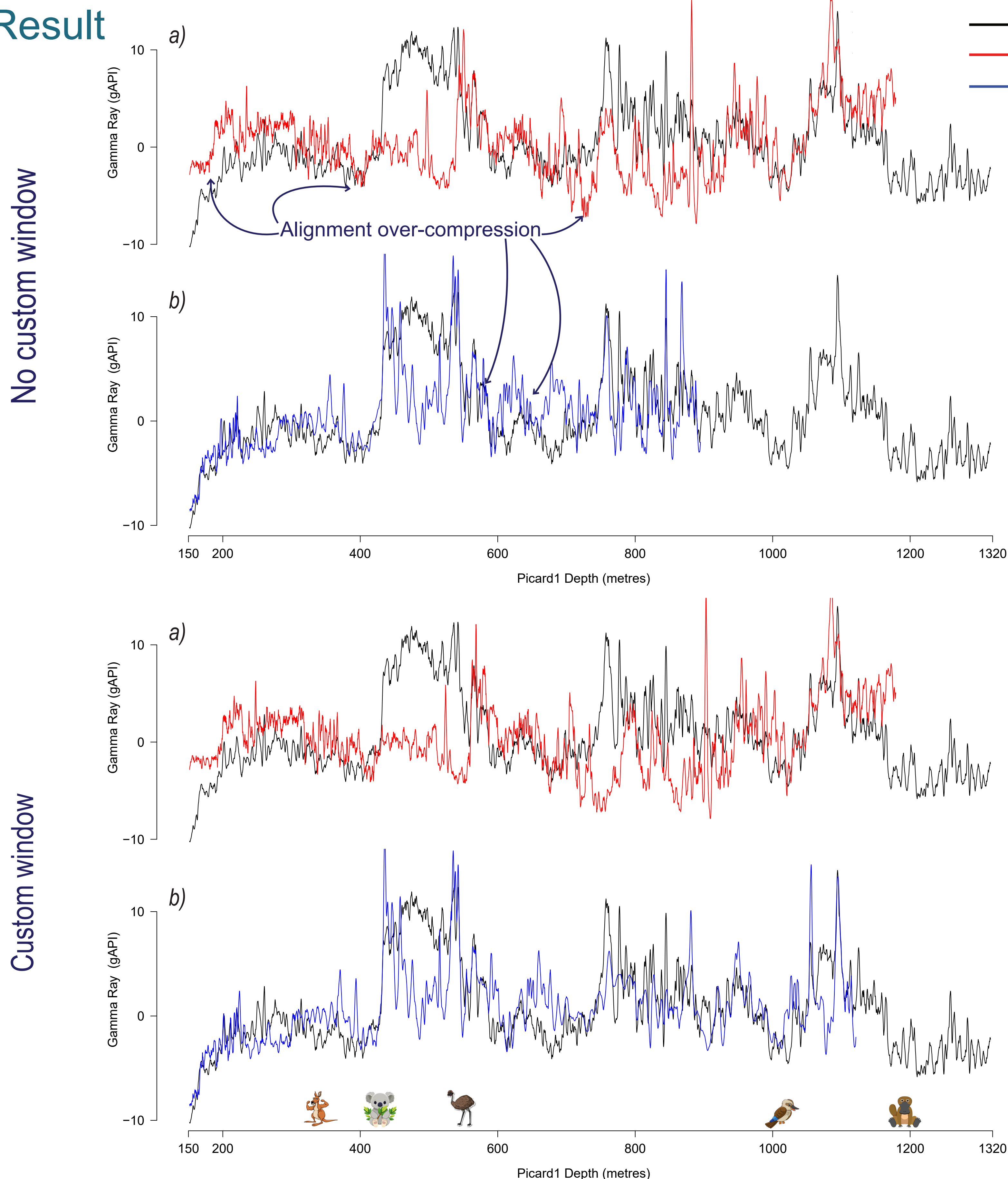
b) custom



## Window Function



## Result



## Key Findings

➔ No Custom Window

- More computation time (~10-15 s)
- Poor correlation quality

➔ Custom Window

- 25-30% reduction in computation time
- Evaluates all possible stratigraphic correlations
- Improvement in correlation quality
- Stratigraphically plausible correlation

