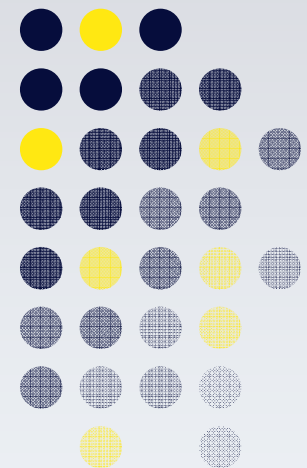
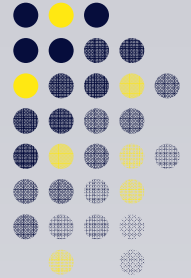


Spiral Software Tools for Assay Management

COQG Meeting, 25th May 2006,
Houston

Dr Mukund Unavane & Dr Owen O'Loan
Spiral Software

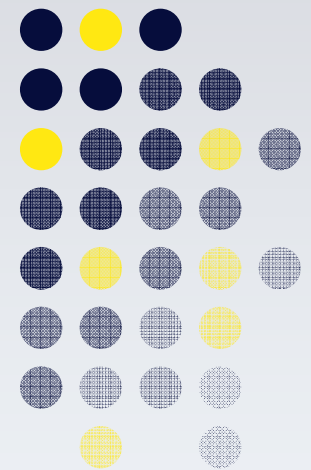


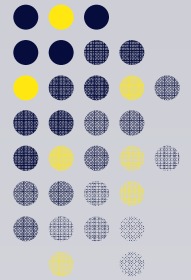


Outline

1. Introduction to Spiral Software
2. Example : Variable Crude Quality
3. CrudeSuite : Crude Assay Management tools
4. Demonstration

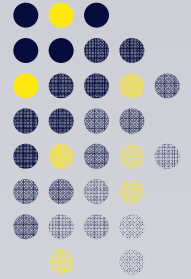
Introduction to Spiral Software





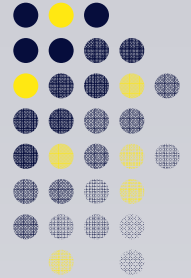
Introduction to Spiral

- Founded in 1998, based in Cambridge, UK
- Specialise in developing advanced technology for crude oil data handling and modelling
- Expertise in building models from large and variable-quality data sets
- Expertise in managing large databases and providing global IT solutions



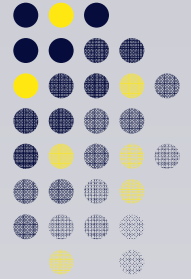
Inspiration

- Crude oil quality is decreasing
- Product quality specifications are becoming tighter
- Increasing industry realisation of cargo oil quality variation economic impact
- Opportunity to provide tools and services focussing on crude oil data handling and quality variation
- Making innovative use of recent advances in mathematics and IT



Software Implementations

- Integrated oil major:
 - Global, web-based system
 - Input data from internal and external data sources
 - Provides data to simulation, planning and scheduling
- Single-site refiner:
 - Desktop-based system providing data for planning and scheduling systems
- Equity crude producer or trading company:
 - System for determining detailed refining value to consumer refineries

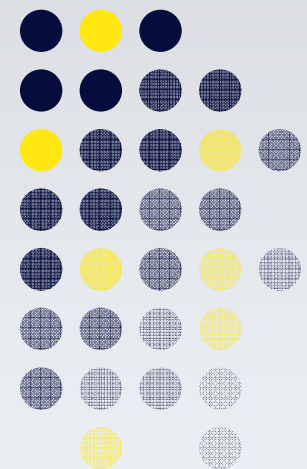


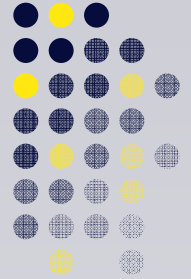
Consultancy and Services

- Laboratory analysis
 - Integrated assay facility through a network of partner laboratories
- Crude oil database management
- Planning and scheduling systems
 - Making best use of crude oil data in planning systems
 - Understanding risk
- Client-specific modelling
 - Advanced modelling projects



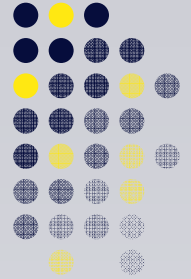
Example: Variable Crude Quality





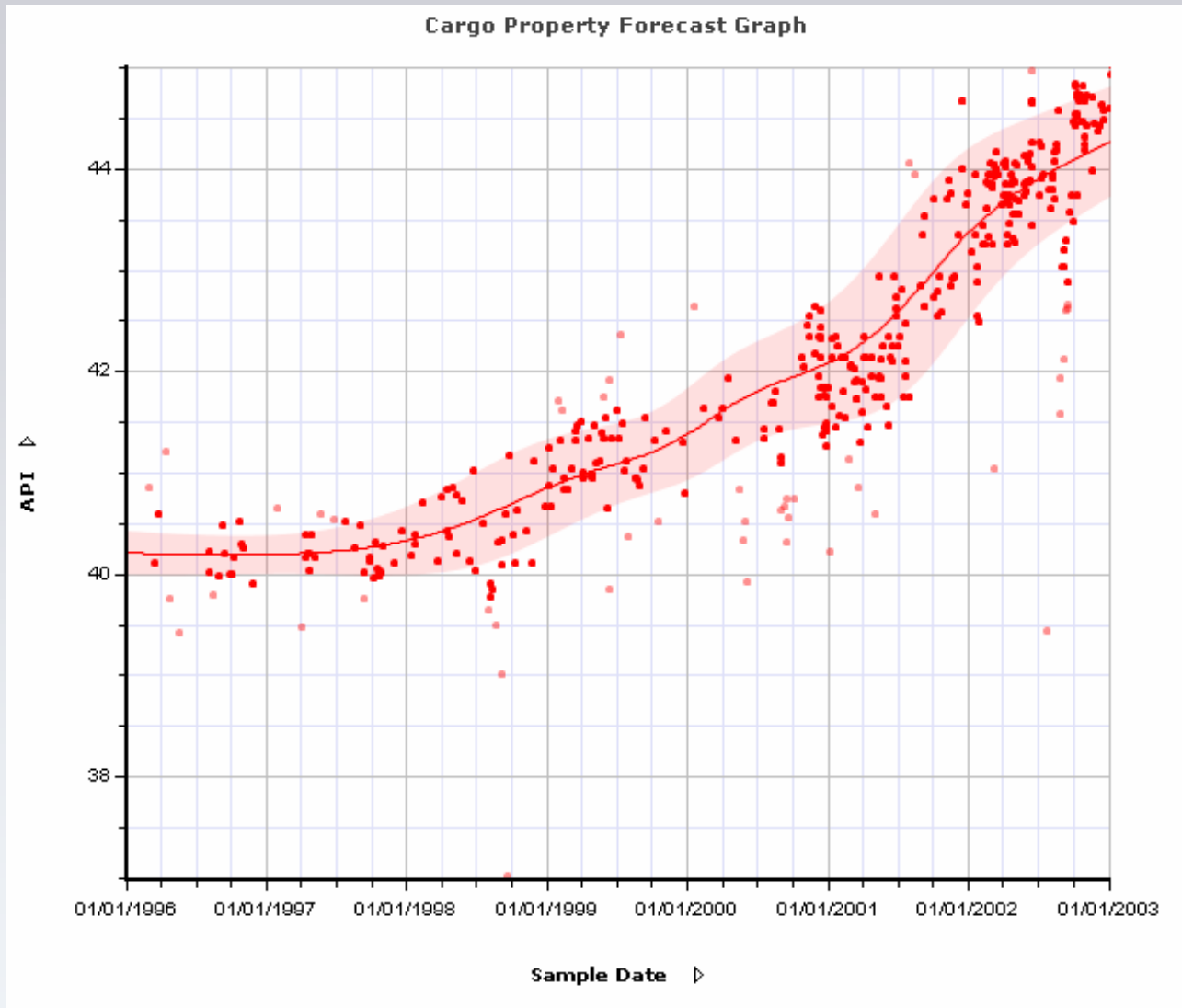
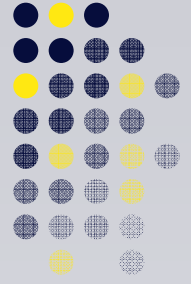
Variable Cargo Qualities

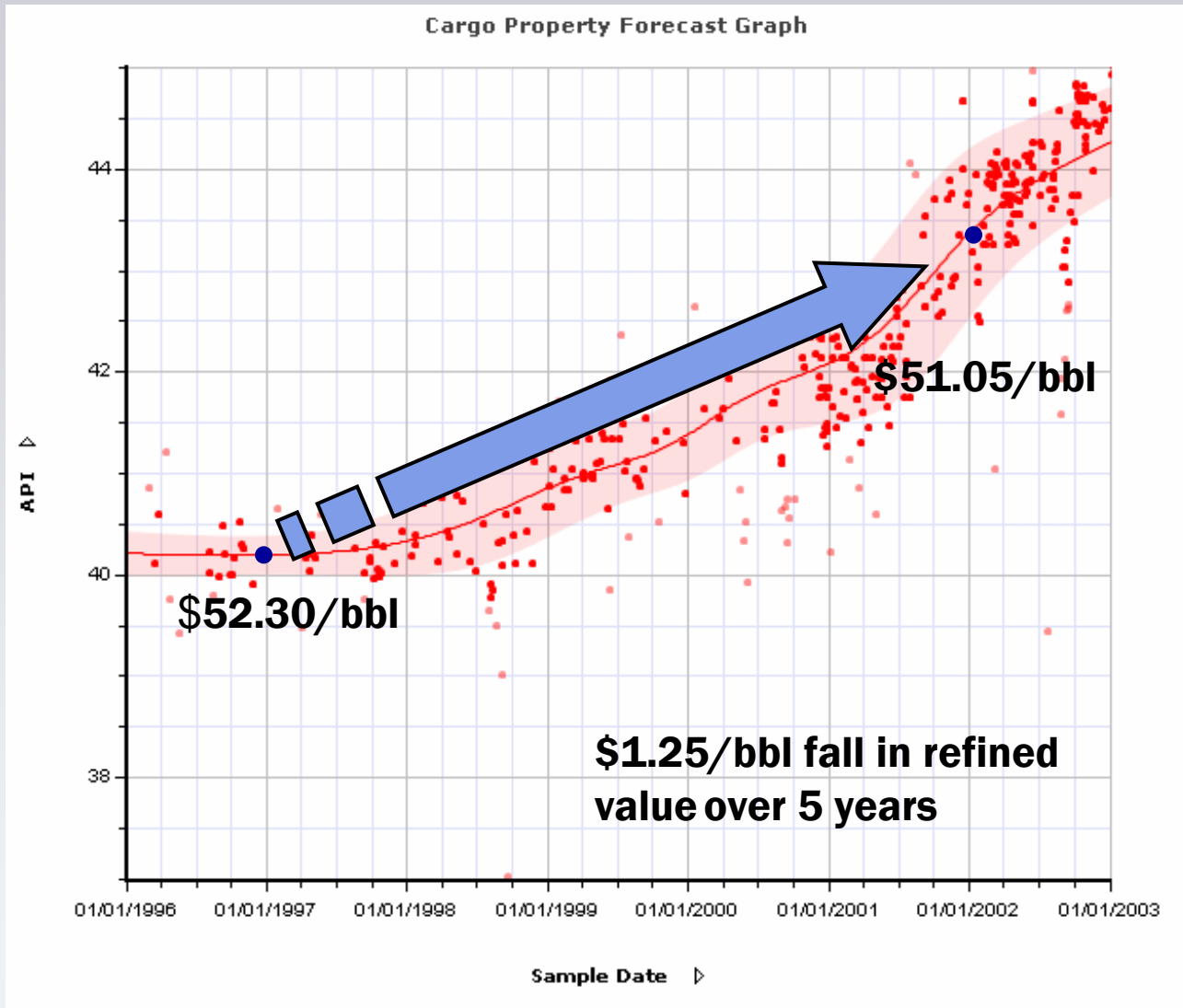
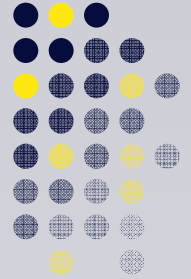
- Crude oil trades are unusual: large transactions on the basis of very limited quality information.
- Often only density and sulphur are known
- Swings can be very large between cargoes: up to 4 API in whole crude density
- Cargo variation in API has a large impact on refining values:
 - Yield risk: 30% change in cut yields
 - Value risk: >\$2/bbl value difference



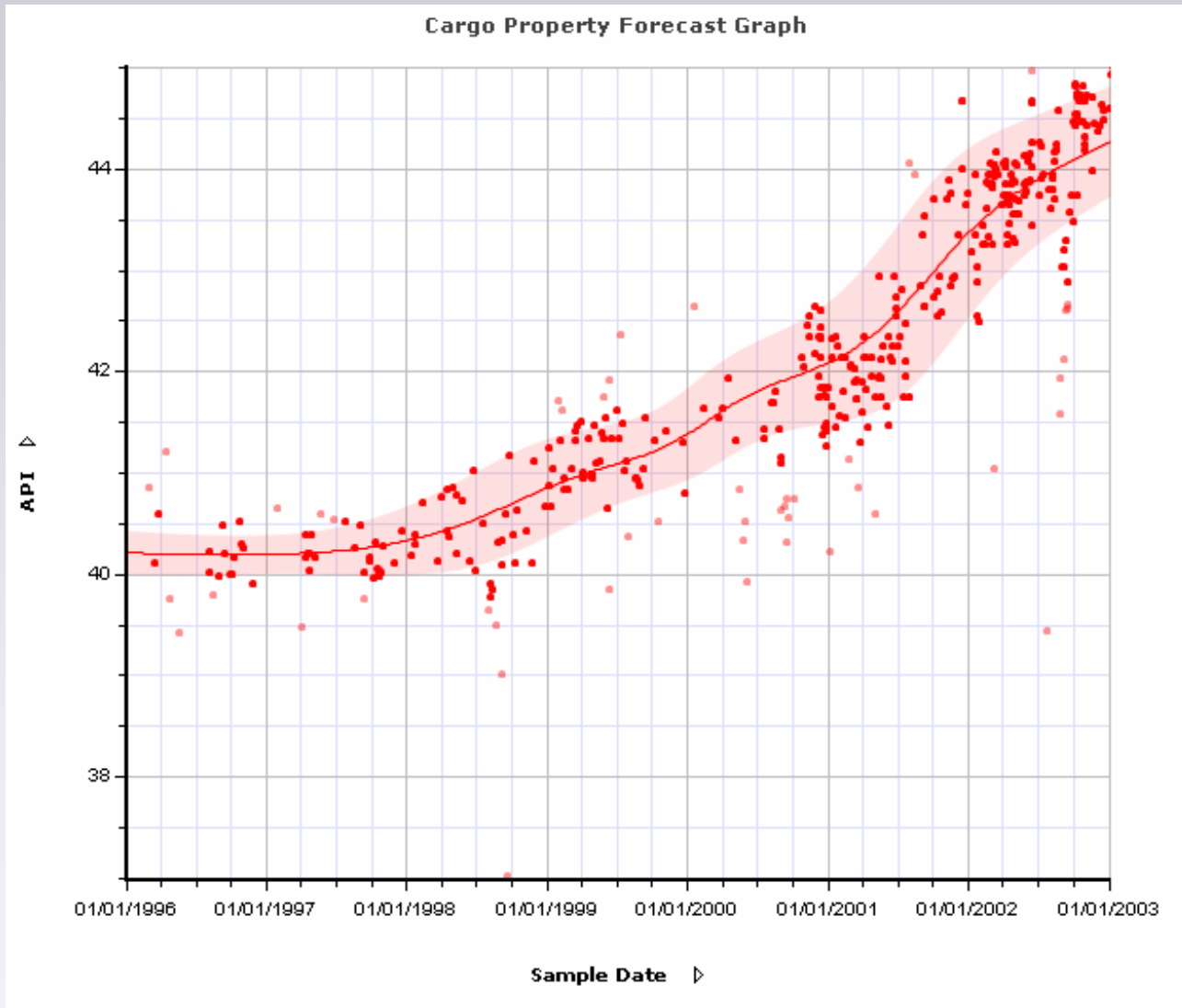
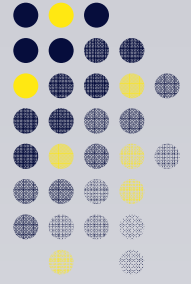
Sources of Variation

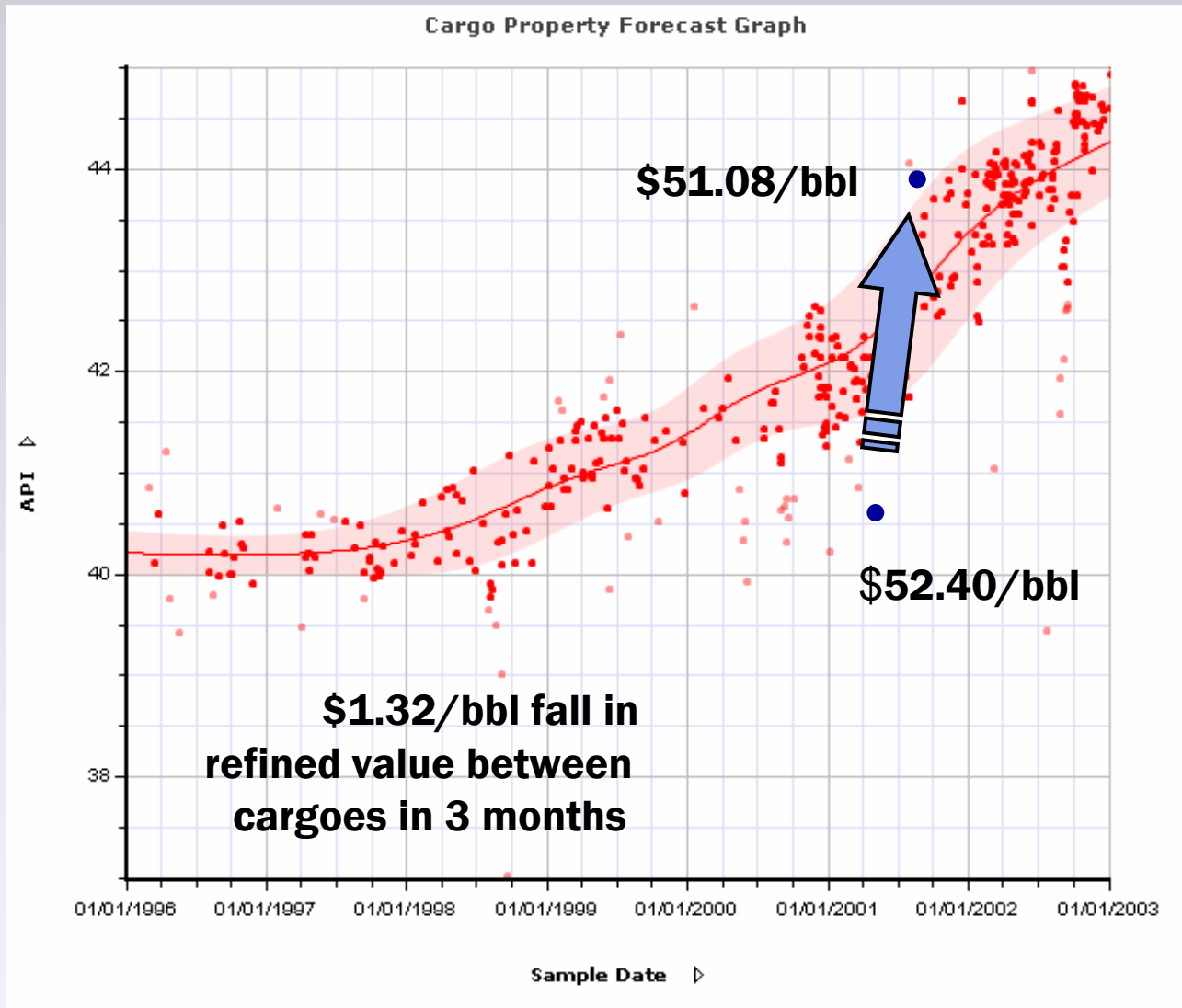
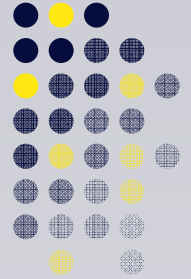
- Seasonal variation
- Planned change in production blend
- Unplanned change in production blend
- Contamination
- Transport changes





Generic medium complexity refinery, European market, July 2004

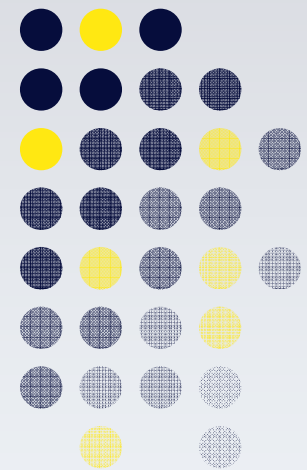


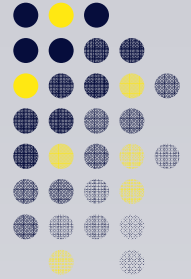


Generic medium complexity refinery, European market, July 2004



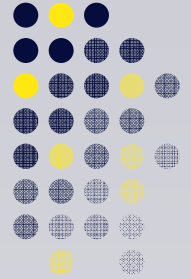
CrudeSuite: Crude Assay Management





CrudeSuite Tools

- CrudeSuite is a range of desktop and network tools for corporate implementations
- Features include:
 - Tabular and graphical data viewing and editing
 - Prediction of complete qualities from limited data
 - Sharing qualitative crude oil experience and news
 - Economic modelling tools
 - Off-the-shelf integration with downstream tools
 - Network synchronisation



Assay Data Features

- Customisable data entry, built around typical assay formats
- Correct handling of repeat measurements
- Advanced data validation
- Perfect and thermodynamic fractionation modelling for both input and output data
- Configurable blending methods and user property correlations

