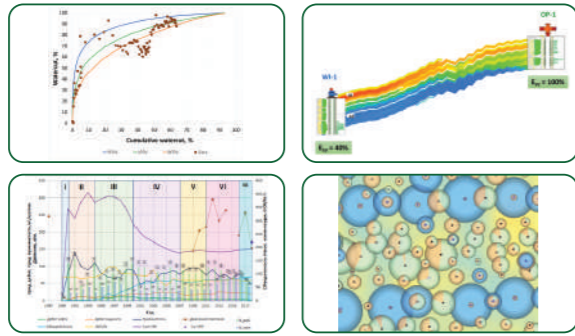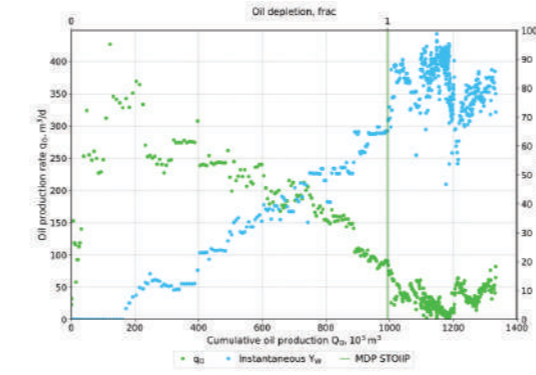**sofoil**

PRIME

sofoil.com

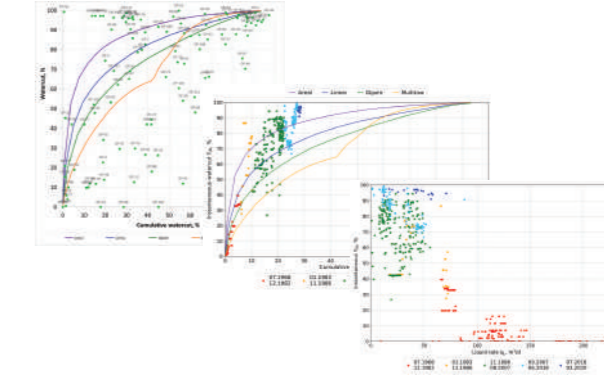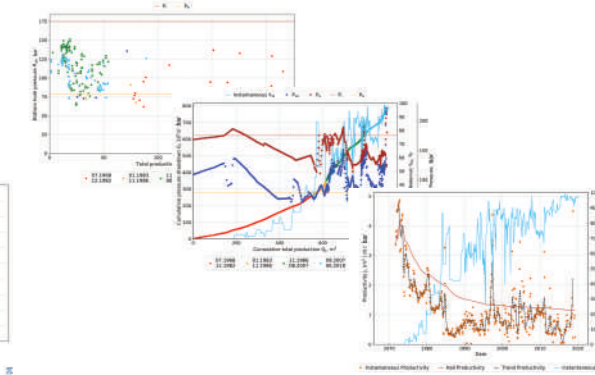| DEFINITION	APPLICATION	INPUT DATA	DECLINE CURVE	MATERIAL BALANCE	WATERCUT DIAGNOSTICS	PRODUCTIVITY DIAGNOSTICS
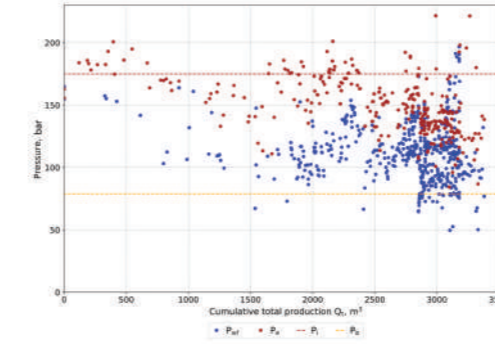
DEFINITION

PRIME is a workflow built around a set of high-level production performance metrics generated by **PolyPrime** software based on production history data (such as flow rates, pressures, water cut, well test and production logs) with zoom on wells and field areas that are lagging behind production or recovery targets due to well integrity issues, poor well-reservoir contact, poor reservoir continuity, non-uniform recovery or inaccurate understanding of the initial reservoir properties.

APPLICATION

1. Identify opportunities for infill drilling/sidetrack/water shut-off/stimulation

2. Identify opportunities for improving waterflood efficiency

3. Identify opportunities for improving well deliverability

4. Creating a list of candidates for workovers and field surveys

5. Prepare the input data for full-field flow simulations.

INPUT DATA

Production history well-by-well:
- Production/Injection rates
- Formation pressure
- Bottom-hole pressure
- Well completion
- Well Interventions
- Reservoir Data Logs

Field surveys reports:
- Cased-hole Logging
- Well Tests

FDP:
- Reservoir and fluid properties
- Initial reserves report
- Initial production schedule

DECLINE CURVE

PolyPrime generates Decline Curve plots for each well and selected groups of wells with automatically fit models.
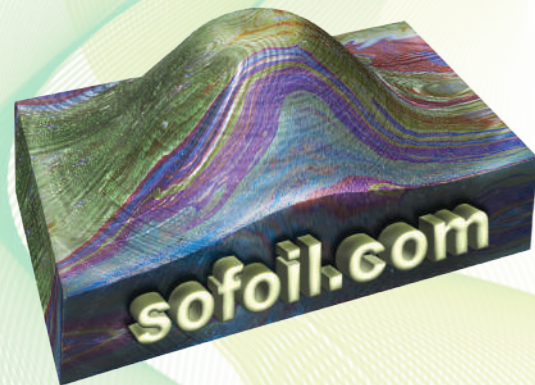
Conventional and Advanced Decline Curve Analysis provide the robust tool for production forecasts and assessing the remaining recoverable reserves without detailing the reservoir properties. The advanced models are based on watercut and watercut+production dynamics.

MATERIAL BALANCE

PolyPrime generates Material Balance Analysis plot for each well and selected groups of wells which is based on historical records of formation and bottom-hole pressure and can help understand reservoir and boundary properties and models a wider range of future production scenarios comparing to Decline Curve Analysis.

WATERCUT DIAGNOSTICS

PolyPrime generates several watercut diagnostic plots for the group of wells under study, including the Chan plot, Fractional Flow, Watercut vs Liquid Rate and ΥΣΥ (Watercut vs Cumulatives).

The ΥΣΥ-analysis is based on auto-generated 3D micro-models specific to the field properties.

PRODUCTIVITY DIAGNOSTICS

PolyPrime generates a handful of productivity performance metrics for each well and selected groups of wells, including the IPR, Hall plot, rate-drawdown cross-plot, instantaneous PI and various filters (median and wavelet) which help understand the historical dynamics of productivity index.

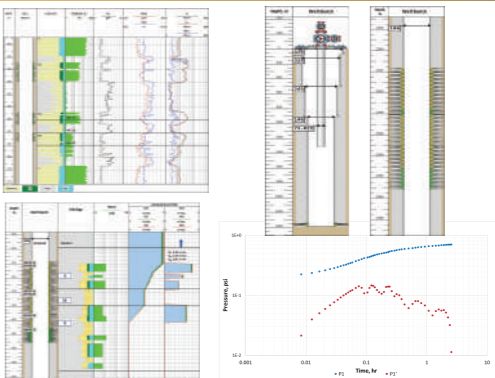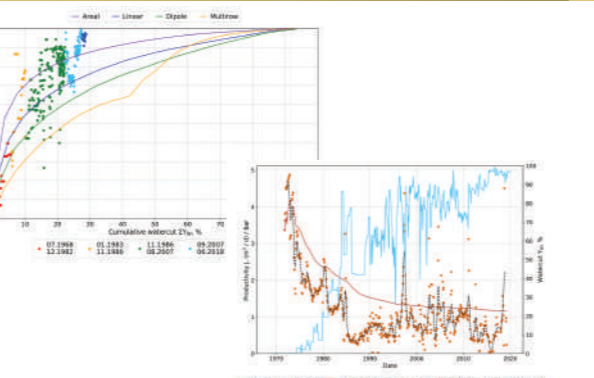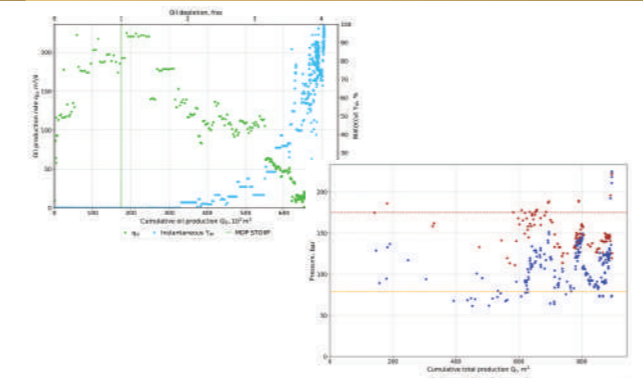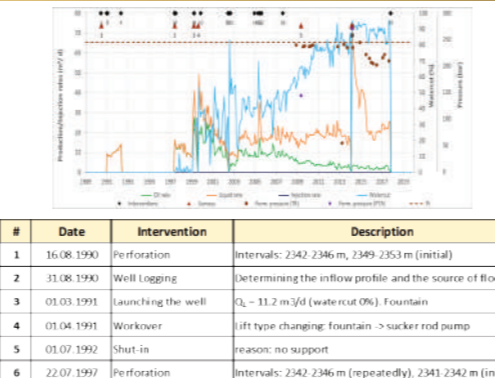| RESERVES ALLOCATION | PRODUCTION ALLOCATION | PRODUCTION MAPPING | WELL PASSPORTS | WELL PASSPORTS | WELL PASSPORTS | WELL PASSPORTS | WELL PERFORMANCE DIAGNOSTICS |

RESERVES ALLOCATION

The initial reserves allocation per well is based on Voronoi-grid and input data on reservoir properties in each well.

These numbers are further used in auto-generated 3D micromodelling facility for recovery, productivity and watercut diagnostic metrics.

PRODUCTION ALLOCATION

PRIME workflow includes the routine analysis of historical PLTs and drawing those over the reservoir cross-sections which helps understand the vertical production/injection profile and allocate historical production/injection rates per each reservoir unit, including thief production/injection.

PRODUCTION MAPPING

Once vertical allocation is completed **PolyPrime** generates the current and cumulative production/injection bubble maps for each reservoir unit and helps understand the production scenario in each unit.

WELL PASSPORTS

PolyPrime generates individual well passports which includes:

✔ Production history
✔ Interventions history

WELL PASSPORTS

✔ Decline Curve Plots
✔ Material Balance Plot
   - Flowing Material Balance Plot
✔ Fractional Flow Plots

WELL PASSPORTS

✔ Watercut Diagnostic Plots
✔ Productivity Plots:
   – Total productivity
   – Oil productivity
   – Gas productivity

   – Hall and Wavelet plots
   – IPR and ΔP cross-plots

✔ Neural Network Regression to offset injection

WELL PASSPORTS

✔ Reservoir Data Logs
✔ Well schematic
✔ Cased Hole Logs
✔ Well tests

WELL PERFORMANCE DIAGNOSTICS

The ultimate outcome of the PRIME analysis is the summary table showing well diagnostics, its justification and recommendations for additional surveillance and workovers.

It provides estimation if well is inline with recovery targets, if depletion is uniform across reservoir units and if it is a suspect of well integrity issues, particularly in thief production/injection.

Well	Diagnostics	Substantiations	Recommendations	
			Surveys	Workovers
OP-1		YΣY, YLIQ	PLT	Water shut-off
WI-2		Low PI	PTA	Stimulation (EOR)
OP-3		YΣY, PLT	PLT	Selective stimulation
WI-5		PTA @10.2020	PLT, PCT	Water shut-off
WI-7		PLT @04.2019	PCT	Water shut-off
OP-33		PTA @05.2017	PLT	Organize pressure maintenance
OP-35	On schedule	---	---	---