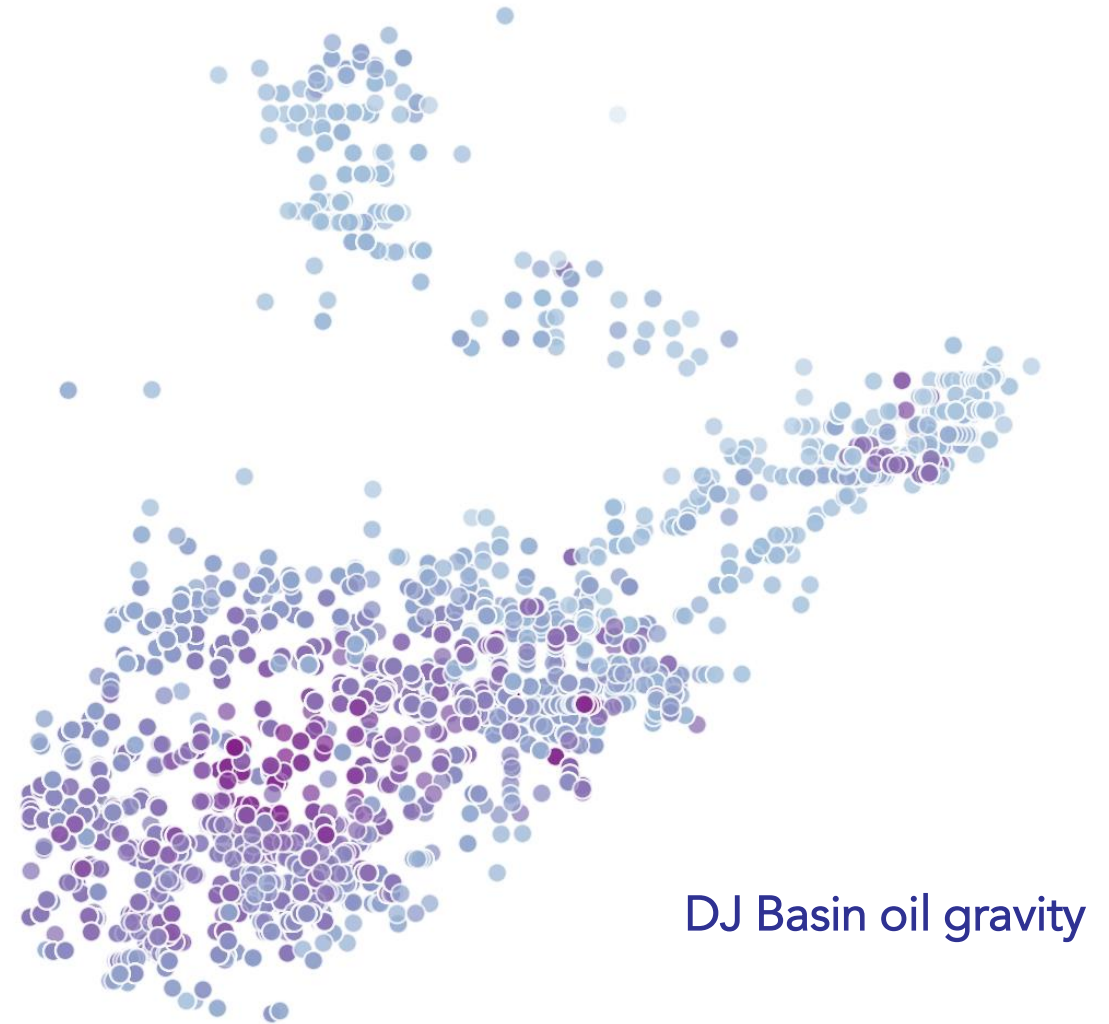


What Can We Learn From Public Data?

Using only public data, we can analyze geologic, operational, and production variables to infer best practices and ideal positions within any basin



Horizontal completions after 1/1/2003, DJ basin

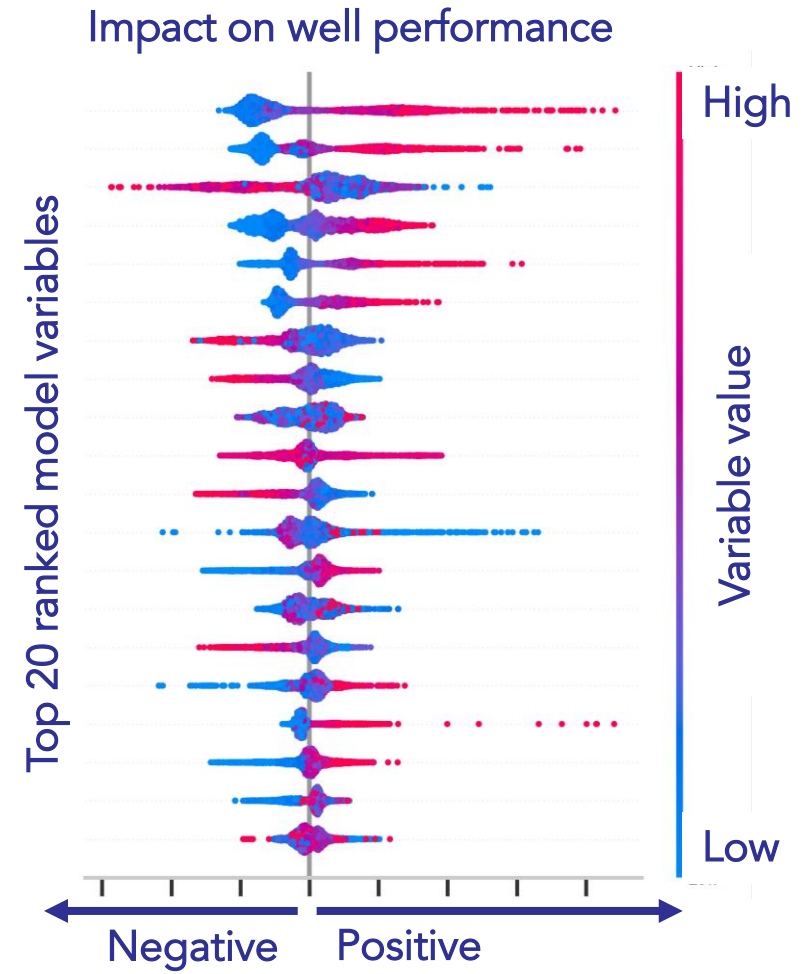
It's Not Who Has the Best Algorithm That Wins

It's who has the most data

Machine learning model leveraging 45 variables and over 5,000 horizontal wells solely from public data provides meaningful insight into relationships between operator strategies, geology, and well performance

Multi-target regression model generates full decline curve profiles for hyperlocal type curve generation unique to operator practices, offset wells and spacing interaction, and geologic trends

Plot shows the relative impact and directional influence on well performance for the top twenty variables in the model



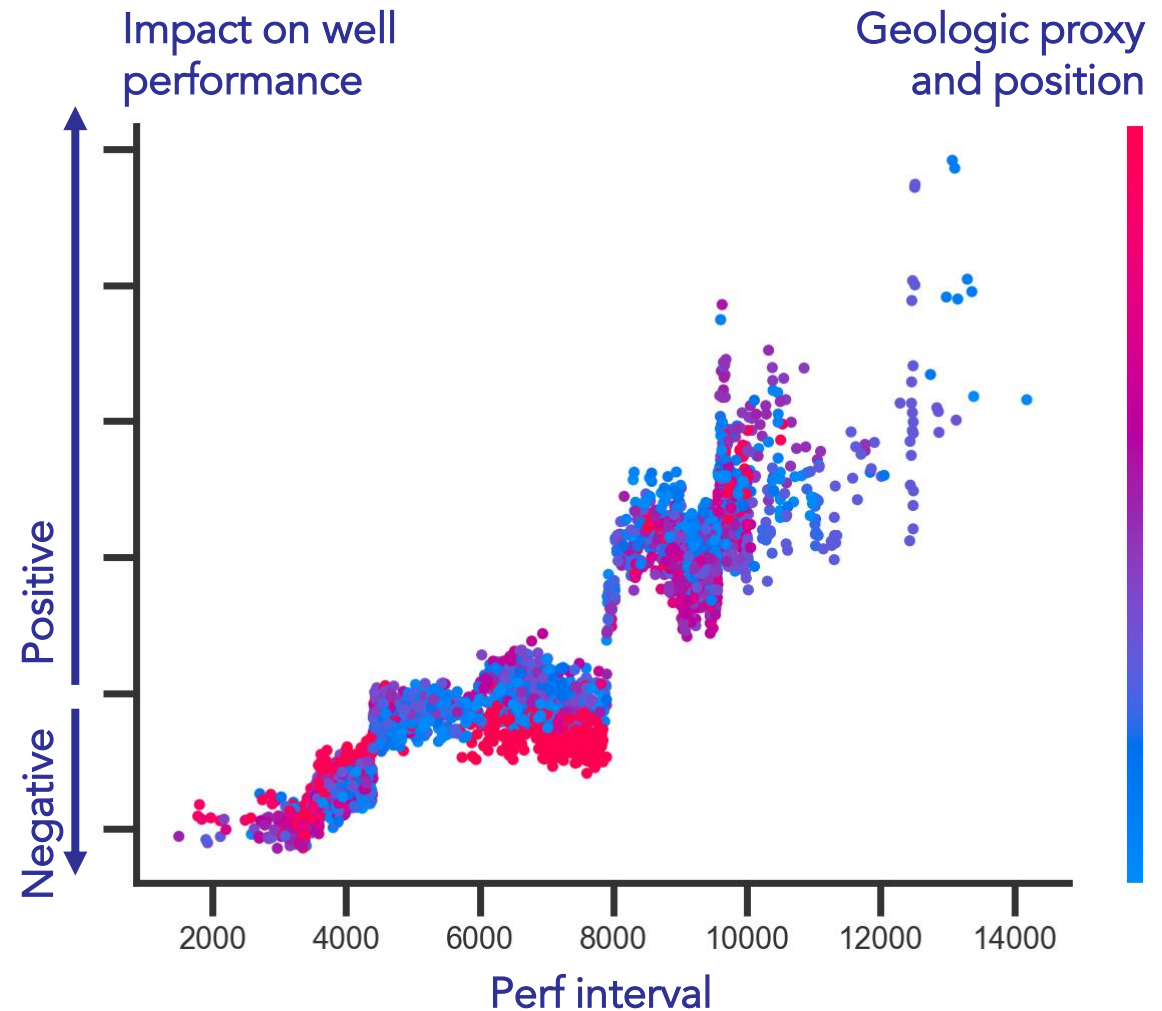
Horizontal completions after 1/1/2003 in the DJ Basin, well performance defined as 36 month cumulative oil production

Geology Matters

In the DJ Basin (but not necessarily other basins), well performance increases linearly with lateral length

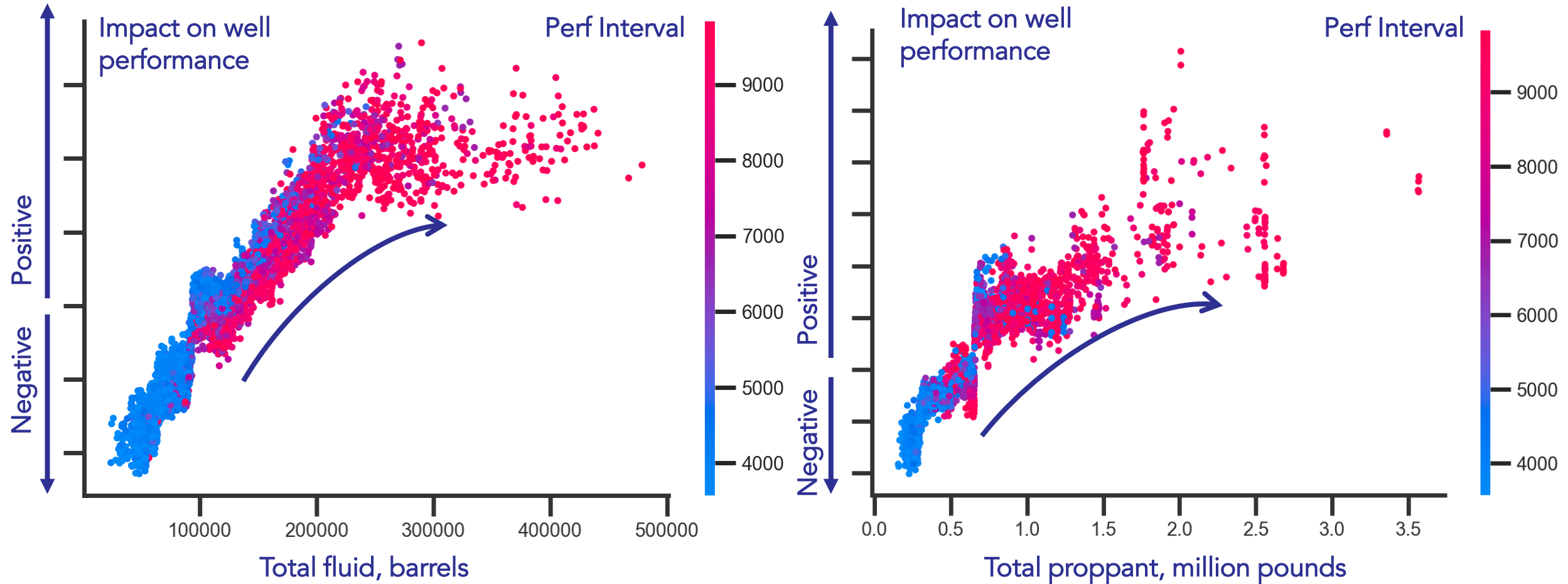
Distinct clustering by lateral length for SRL, MRL, and XRL wellbores

Within each lateral bin, well performance separates by geologic characteristics and location within basin



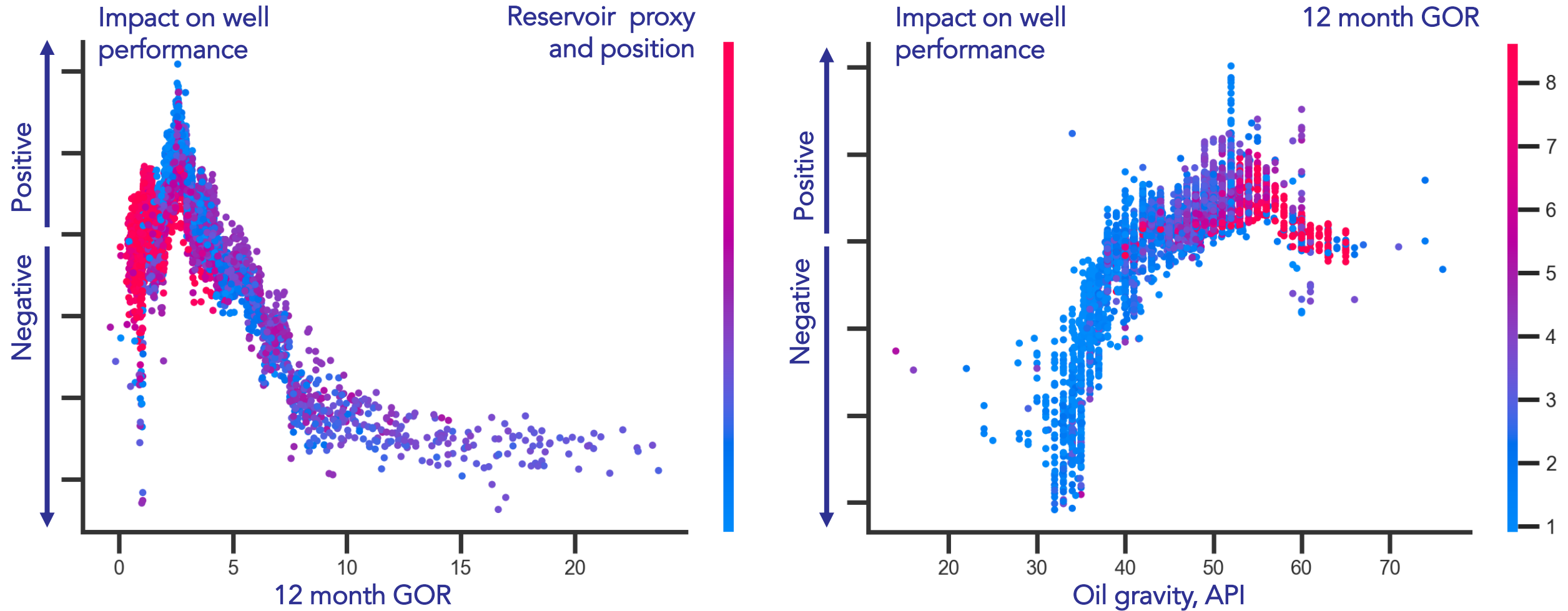
Horizontal completions after 1/1/2003 in the DJ Basin, well performance defined as 36 month cumulative oil production

Bigger Completions, Marginal Returns



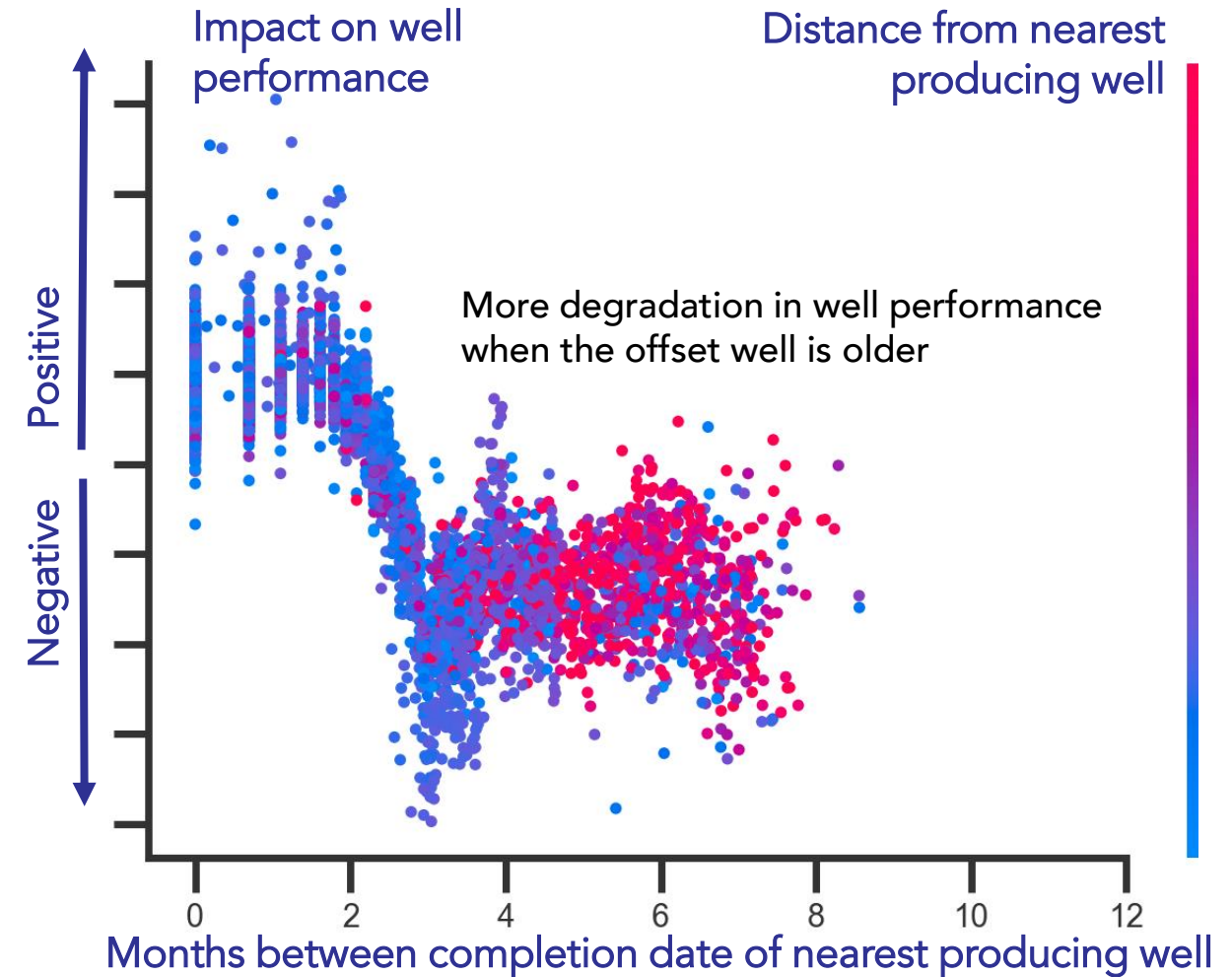
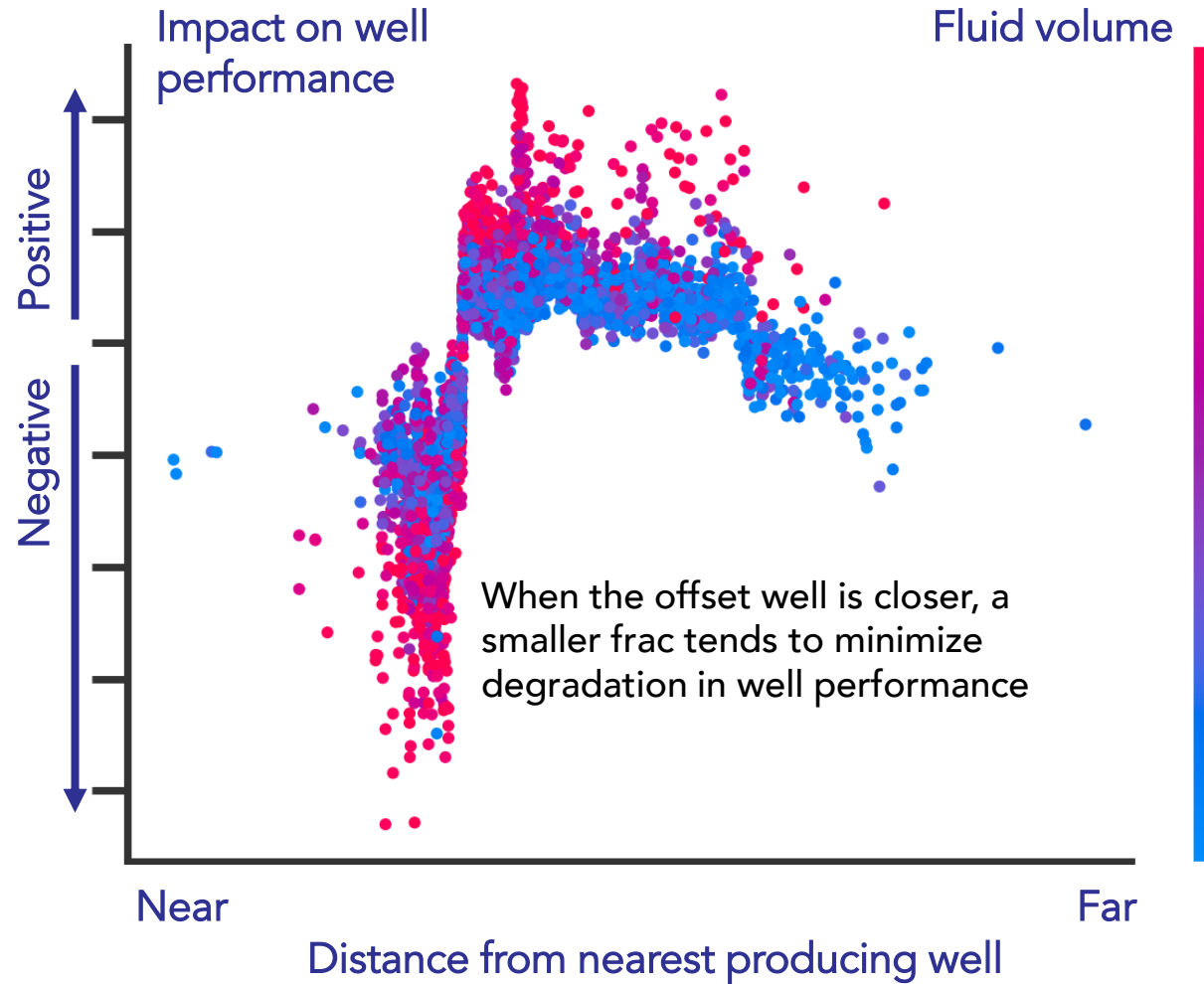
Horizontal completions after 1/1/2003 in the DJ Basin, well performance defined as 36 month cumulative oil production

Phase Windows Impact Oil Recovery



Horizontal completions after 1/1/2003 in the DJ Basin, well performance defined as 36 month cumulative oil production

Optimizing Frac Design for Infill Development



Horizontal completions after 1/1/2003 in the DJ Basin, well performance defined as 36 month cumulative oil production

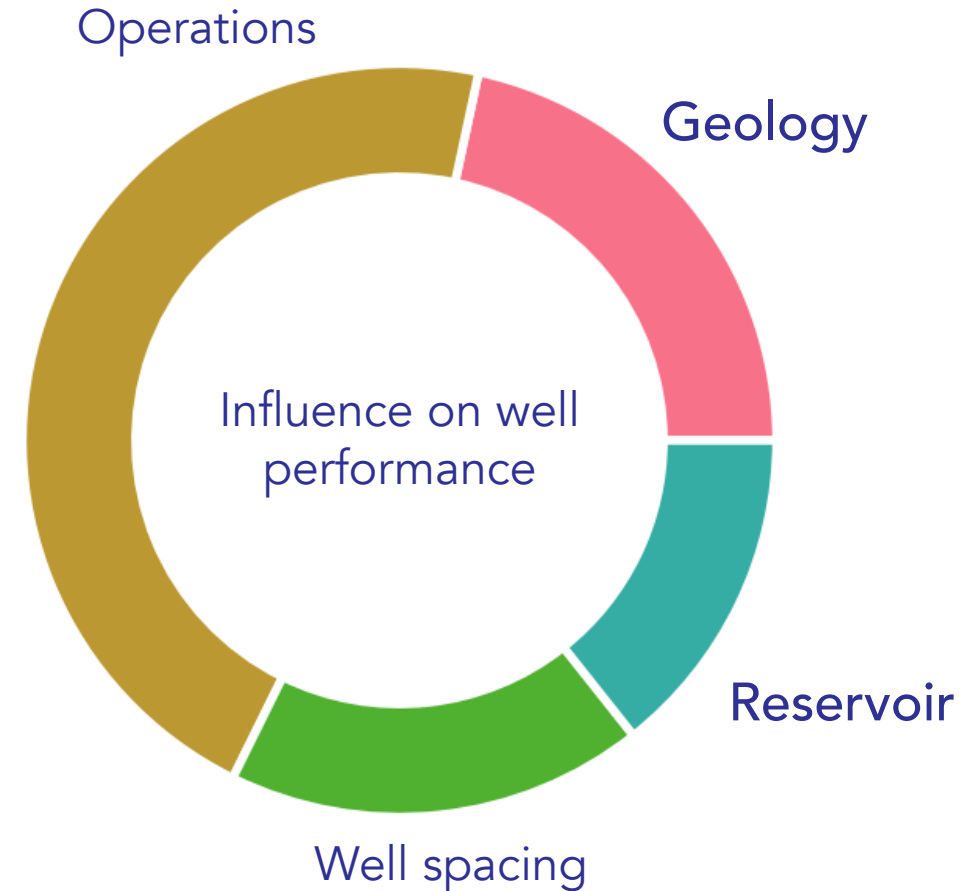
Geology Still Drives Value

Geologic and petrophysical characterizations are difficult, complicated, and highly interpreted due to the significant variability and often discontinuous nature of the reservoir systems

This work is still relevant and can be greatly assisted with statistical learning techniques

Plot shows that geologic and reservoir variables can explain a third of a well's performance and characteristics

It's not physics vs analytics, it is physics plus analytics



Horizontal completions after 1/1/2003 in the DJ Basin, well performance defined as 36 month cumulative oil production, operations encompasses drilling, completions, and production management variables, spacing includes distance between wellbores and timing of completions