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Distribution and characteristic features of volcanic rocks in and around the Minami Nagaoka Gas Field from the view point of reservoir geology

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Abstract: The distribution pattern of the Green Tuff rock type and facies in the Niigata Sedimentary Basin, with a central focus on the ‘Nagaoka Area’, may have been controlled by rifting and other structural development in the Nanatani Stage. The term “Volcanic Sequence” model is now propounded as a volcanostratigraphic framework for the compound Green Tuff succession which encountered in the Minami Nagaoka Gas Field, based on the comprehensive interpretation and crossed understanding of a large variety of volcanic rock types and facies and their changes in physicality and geochemical composition. The model comprises five volcanic sequences such as the Volcanic Sequence I, II, III_R, III_B and IV in ascending order. The Volcanic Sequence I and II consist of non-acidic rocks, and the former characterized with an extremely high resistivity is sharply distinguished from the latter. The acidic Sequence III_R which has a bimodal relationship with the basaltic Sequence III_B consists of multi-stacked rhyolitic lava-flows and/or lava-domes. Those are able to be identified based on the composite interpretation of the presumed rock facies together with dipmeter data in each well. The Sequence IV, a thin basaltic flow unit, is limited its distribution to the northern part of the field. Reservoir geological interpretation based on the “Volcanic Sequence” model might be able to explain heterogeneous facies distribution, and different productivities and pressure performances among wells..In the

'Nagaoka Area', some of the vintage wells encountered acidic rocks corresponding to the Volcanic Sequence III_R and the lowermost part of the underlying non-acidic rocks are extremely resistive like the Volcanic Sequence I. In order to predict the distribution of acidic volcanic bodies which remain undiscovered, it is worth trying to re-interpret the vintage wells and seismic data from the aspect of the "Volcanic Sequence"

Key words: [Green Tuff](#), [volcanic reservoir](#), [reservoir heterogeneity](#), [volcanic sequence](#), [rhyolite](#), [lava-flow/lava-dome](#), [Nagaoka](#), [Niigata](#)

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