

Exploring AI-Assisted Translation and Climate Data Extraction from Alaskan Russian Missionary Diaries: Arctic Climate Research

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Climate change is affecting Arctic regions at an alarming rate. To understand climate change impacts and adaptations in Alaska, more data is needed on historical climate phenomena. The travel journals from Russian missionaries of the Lower Yukon Region in Alaska from the 19th to early 20th centuries are a potential source of historical environmental knowledge. These historic travel journals—written in pre-reform Russian orthography—are largely inaccessible to both modern communities and researchers. Here, our interdisciplinary team assesses the ability of a large language model (LLM), Chat GPT, to translate these travel journals and extract climatic data. This pilot project aims to identify temporal and environmental patterns within the journals through extraction of dates and weather-related terms. We manually verified date and weather- word occurrences, extracted with Chat GPT, from scans of approximately 400 journal entries spanning four years to generate training data for LLM supervised learning. Results show strong seasonality, with diary activity peaking in spring (approximately 78% above the mean) and declining in late summer and fall (approximately 60% below the mean). The frequency patterns of the weather-words indicate the environmental conditions that influenced travel and operations were more likely to be recorded. This groundwork lays the foundation for future LLM supervised learning.

Index Terms: LLM, AI Translation, Travel Journals, Image/Text Analysis, Environmental Application, Arctic