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Geochronological and Sedimentological Constraints of the Srisailam Formation, S.E. India



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TABLE OF CONTENTS

1. INTRODUCTION.....	5
2. GEOLOGICAL SETTING.....	6
3. SAMPLING AND ANALYTICAL METHODS.....	10
3.1 Sequence Stratigraphy.....	10
3.2 Sample Descriptions.....	10
3.2.1 SAMPLE RG-01.....	10
3.2.2 SAMPLE RG-02.....	11
3.2.3 SAMPLE RG-04.....	11
3.2.4 SAMPLE RG-15.....	11
3.3 Facies Descriptions.....	12
3.3.1 MARINE SANDSTONE.....	12
3.3.1.1 Depositional Processes and Paleoenvironment Interpretation.....	12
3.3.2 INTERBEDDED FINE SANDSTONE AND SHALE.....	13
3.3.2.1 Depositional Processes and Paleoenvironment Interpretation.....	13
3.3.3 FERRUGINOUS GLAUCONITIC SANDSTONE.....	14
3.3.3.1 Depositional Processes and Paleoenvironment Interpretation.....	14
3.3.4 MUD FLAKE BRECCIA.....	14
3.3.4.1 Depositional Processes and Paleoenvironment Interpretation.....	15
3.3.5 SHALES.....	15
3.3.5.1 Depositional Processes and Paleoenvironment Interpretation.....	15
3.3.6 SANDSTONE WITH RIP UPS.....	16
3.3.6.1 Depositional Processes and Paleoenvironment Interpretation.....	16
3.3.7 FERRUGINOUS SANDSTONE INTERBEDDED WITH SHALE.....	16
3.3.7.1 Depositional Processes and Paleoenvironment Interpretation.....	17
3.4 LA-ICP-MS U-Pb Geochronology.....	17
3.5 LA-MC-ICP-MS Hf Isotope analysis of zircon.....	18
3.6 LA-ICP-MS Trace Element Analysis.....	20
3.6.1 DATA REDUCTION AND TRACE ELEMENT ANALYSIS.....	20
3.6.2 TRACE ELEMENT THERMOMETRY.....	21
3.7 Geophysical Logs.....	22
5. RESULTS.....	22

5.1 GRS Results	22
5.2 Paleocurrent Results	23
5.3 U-Pb Zircon Geochronology Results	23
5.3.1 SAMPLE RG-01	23
5.3.2 SAMPLE RG-15	24
5.3.3 SAMPLE RG-04	24
5.3.4 SAMPLE RG-02	24
5.4 LA-ICP-MS Trace Element Analysis Results	24
5.4.1 ZIRCON REE CHEMISTRY	24
5.4.2 ZIRCON TEMPERATURE ESTIMATES.....	25
5.5 Hf Isotope Results	25
6. DISCUSSION.....	26
6.1 Age Constraints of Sedimentation in the Srisailam Sub-Basin.....	26
6.2 Provenance of the Srisailam Sediments.....	27
6.2.1 SIMILARITIES BETWEEN THE SRISAILAM FORMATION AND NALLAMALAI GROUP	30
6.3 Depositional Environment of the Srisailam Formation.....	31
6.4 Basin Evolution.....	32
7. CONCLUSION.....	33
8. ACKNOWLEDGEMENTS	33
9. REFERENCES	33
10. LIST OF TABLES.....	37
11. FIGURE CAPTIONS.....	38
12. TABLES.....	41
13. FIGURES.....	43

ABSTRACT

The Proterozoic Cuddapah Basin contains the poorly constrained Srisailam Formation, which presumably lies unconformably over the Nallamalai Group. The Cuddapah Basin is thought to have initiated as a rift basin > 1900 Ma before developing into a foreland basin due to uplift of the Eastern Ghats Belt (EGB) at ~1600 Ma. U-Pb geochronology indicates deposition of the Srisailam Formation commenced after 1660 Ma and ceased prior to the deposition of the Kurnool Group which was deposited < 1090 Ma. The Srisailam Formation was deposited in a tidal flat/shallow marine environment as it contains tidal and storms influences, glauconitic sandstones, along with bimodal east-west paleocurrents, which suggest links with an open seaway. Detrital zircon Hf isotope data combined with detrital zircon U-Pb data suggest the Dharwar Craton as a dominant source region with a mixed crustal evolution (ϵ_{Hf} -11 to +8). Detrital zircon age peaks at ~3200 Ma, ~2700-2400 Ma and ~2300 Ma imply that sediments are dominantly sourced from 3400-3000 Ma tonalite-trondhjemite-granodiorite (TTG), 3000-2500 Ma volcanosedimentary greenstone belts and 2600-2500 Ma calc-alkaline to K-rich granitic intrusions. Trace element data suggests zircon grains are sourced from granitoids with zircon crystallisation at ~860°C. This study reveals that the Srisailam Formation is quite possibly a lateral equivalent of the Nallamalai Group.

Key Words: Cuddapah Basin, Srisailam Formation, Eastern Dharwar Craton (EDC), unconformably, Eastern Ghats Belt (EGB), sedimentary, geochronological, Nallamalai Group.