

STANDARDIZED AUTOMATED CO₂/H₂O FLUX SYSTEMS FOR INDIVIDUAL RESEARCH GROUPS & FLUX NETWORKS

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INTRODUCTION

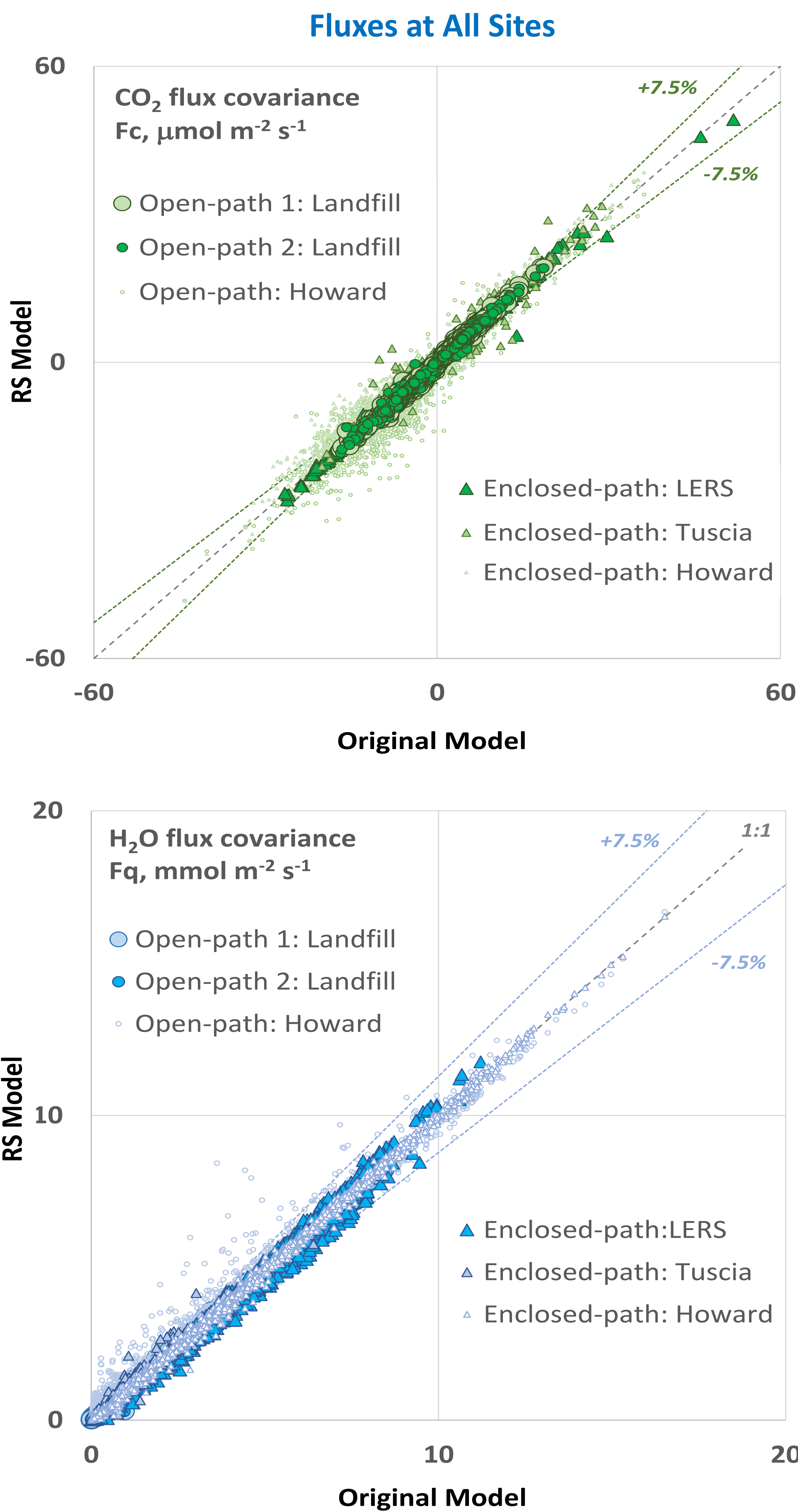
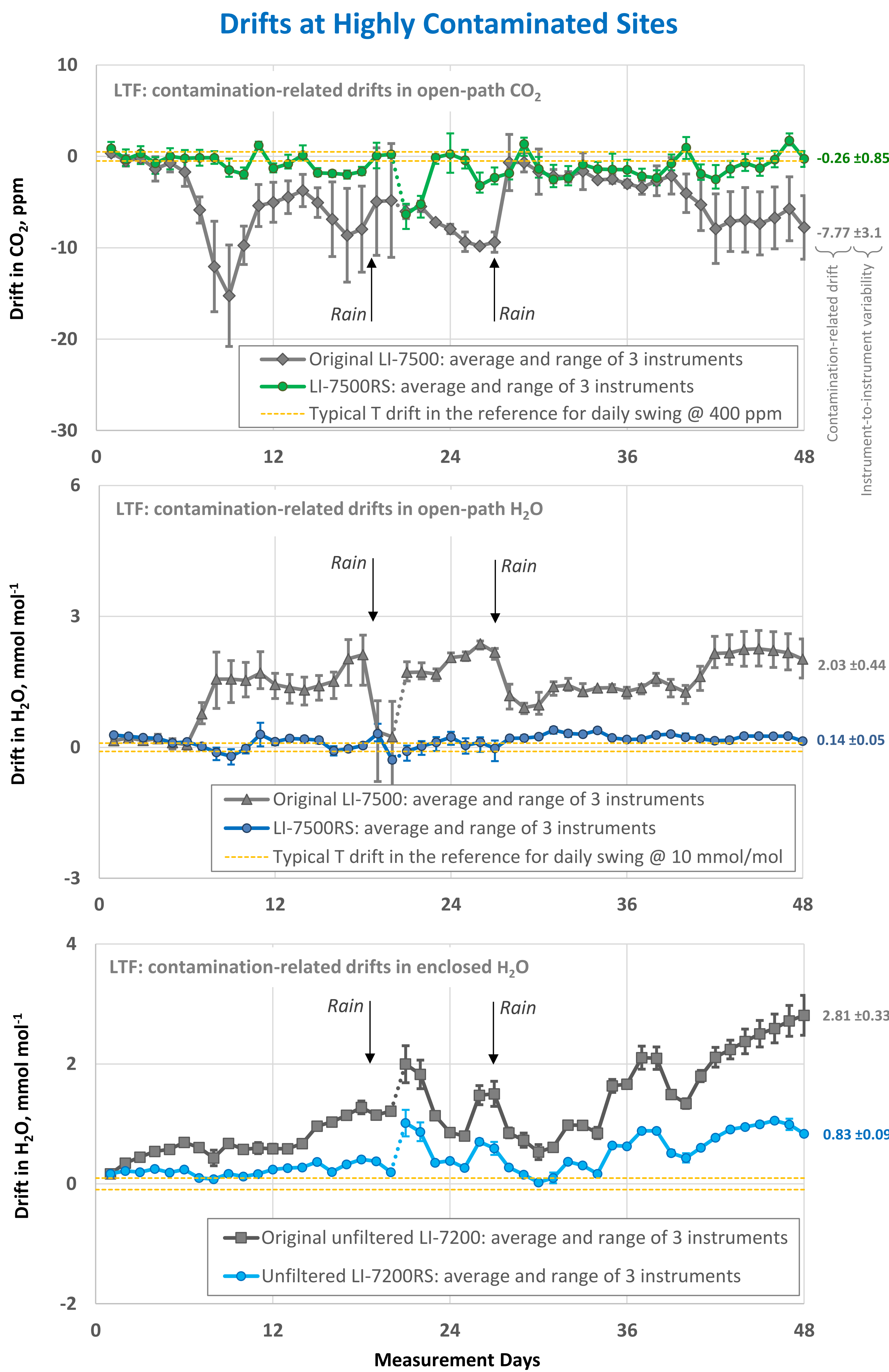
The LI-7500RS and LI-7200RS flux research systems include gas analyzers, but also have additional functionality significantly broader than just measuring CO₂/H₂O concentrations:

- increased stability under contamination and improved temperature controls
- automation and standardization of final flux calculations in real-time onsite
- seamless integration with online tools for flux tower network and data sharing

AUTOMATED RS SYSTEMS

- New automated flux systems output real-time *fully processed fluxes* of CO₂, H₂O, CH₄, H, τ , and auxiliary data
- Low-power weatherized microcomputer, SmartFlux 2, runs EddyPro similar to a desktop
- Fully configurable processing includes *Fourier Transform, spectra, co-spectra, planar fit, progressive RH corrections, etc.*
- All configurations are saved for standardization and traceability
- All-digital integration* includes gas analyzers, anemometers, multiple loggers, etc.
- Onsite clocks synchronized with PTP, *clocks between stations are synchronized using GPS*
- Flux network tool, FluxSuite, shows status, fluxes, weather, flags, etc., sends email alerts, and allows online data access and sharing

GAS ANALYZER FIELD RESULTS



SUMMARY

- Field tests were conducted over six periods 5-14 months long, at 6 diverse sites, using 26 gas analyzers
- Instrument-to-instrument variability was reduced 3-9 fold in all new RS systems vs originals
- CO₂ and H₂O drifts in open-path RS system were few-to-many-tens of times less than in the original models
- The unfiltered enclosed RS system performed substantially better than the original for H₂O drifts, at times drifting few-to-tens of times less
- Improvements in enclosed-path CO₂ drifts were modest, being similar or just a bit better than the original

CONCLUSIONS

- RS systems can significantly reduce site maintenance and improve flux data coverage vs originals models
- Automated standardized onsite flux processing, and settings and configuration files saved and provided with each processed file allow traceability and comparability between sites
- Seamless compatibility with on-line tools minimize day-to-day site management, and make the sharing of flux data very easy

HISTORICAL PERSPECTIVE ON THE NEW RS FLUX SYSTEMS AS KEY TOOLS FOR GLOBAL STANDARDIZATION OF FLUX NETWORKS

