

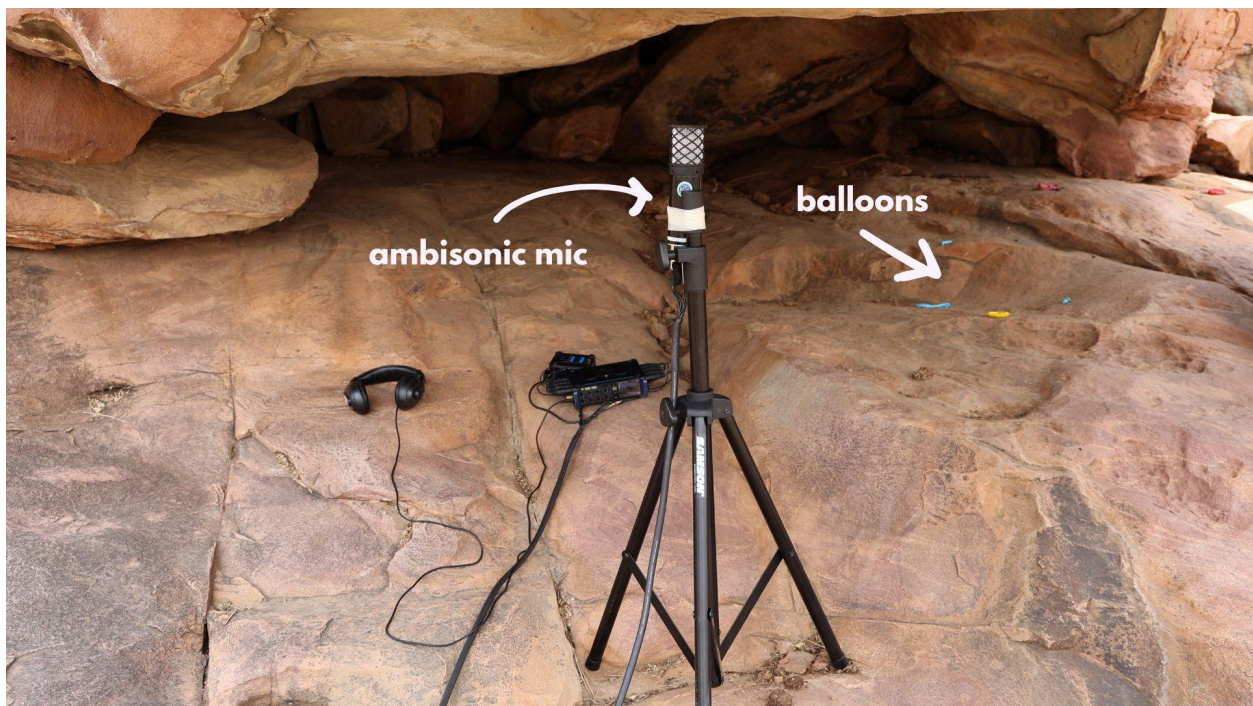
Phonos: Archeoacoustics & Sonic Anthropology

Sound has always been an integral part of how people experience sacred places. Phonos is a state-funded initiative that aims to investigate and map the **acoustic signatures** and **phenomenological aspects** of acoustically and culturally significant spaces.

Archeoacoustics investigates soundscapes by fusing archaeology, acoustics, and anthropology. It bridges the **sciences and the humanities to interpret the past through sound**. By capturing **impulse responses (IRs)** (the acoustic “fingerprints” of a space) we can reconstruct **spatial histories**: what could be heard, where it could be heard from etc.

- We have mapped **37** significant sacred spaces including caves, temples, forts, stepwells in Mesolithic and Medieval sacred sites across Rajasthan
- Partnered with the **Indian Sonic Research Organisation** to conduct acoustic field recordings, and soundmapping

Vertical 1 – Case Study: Bundi Caves, Rajasthan, India



In Rajasthan’s Mesolithic-Early Historic Cave shelters called the Bundi Cave, we conducted one of the first **systematic acoustic surveys using ISO 3382 protocols**, omnidirectional **8-channel ambisonic mic arrays**. We captured impulse responses at multiple positions within the shelter to analyze reverberation, clarity, and spatial energy.

Methodology (symmetric for most soundscapes):

- Measurement Standard: ISO 3382 Acoustical Parameters
- Software: Aurora 5.0
- Capture Setup: 8-channel Brahma Studio ambisonic array
- Analysis: Frequency bands from 31.5 Hz-16 kHz, measuring EDT, T20/T30, C50, C80, D50, G, and lateral energy fractions
- Workflow: Impulse response capture (sine sweep, balloon pop, starter pistol) followed by auralization to recreate immersive listening environments

Findings:

- Position 1: Exceptional acoustic conditions, with speech clarity (C50 up to 13 dB) and musical clarity (C80 up to 25 dB) rivaling purpose-built concert spaces. Reverberation times (0.3–0.6 seconds) supported both speech intelligibility and musical warmth.

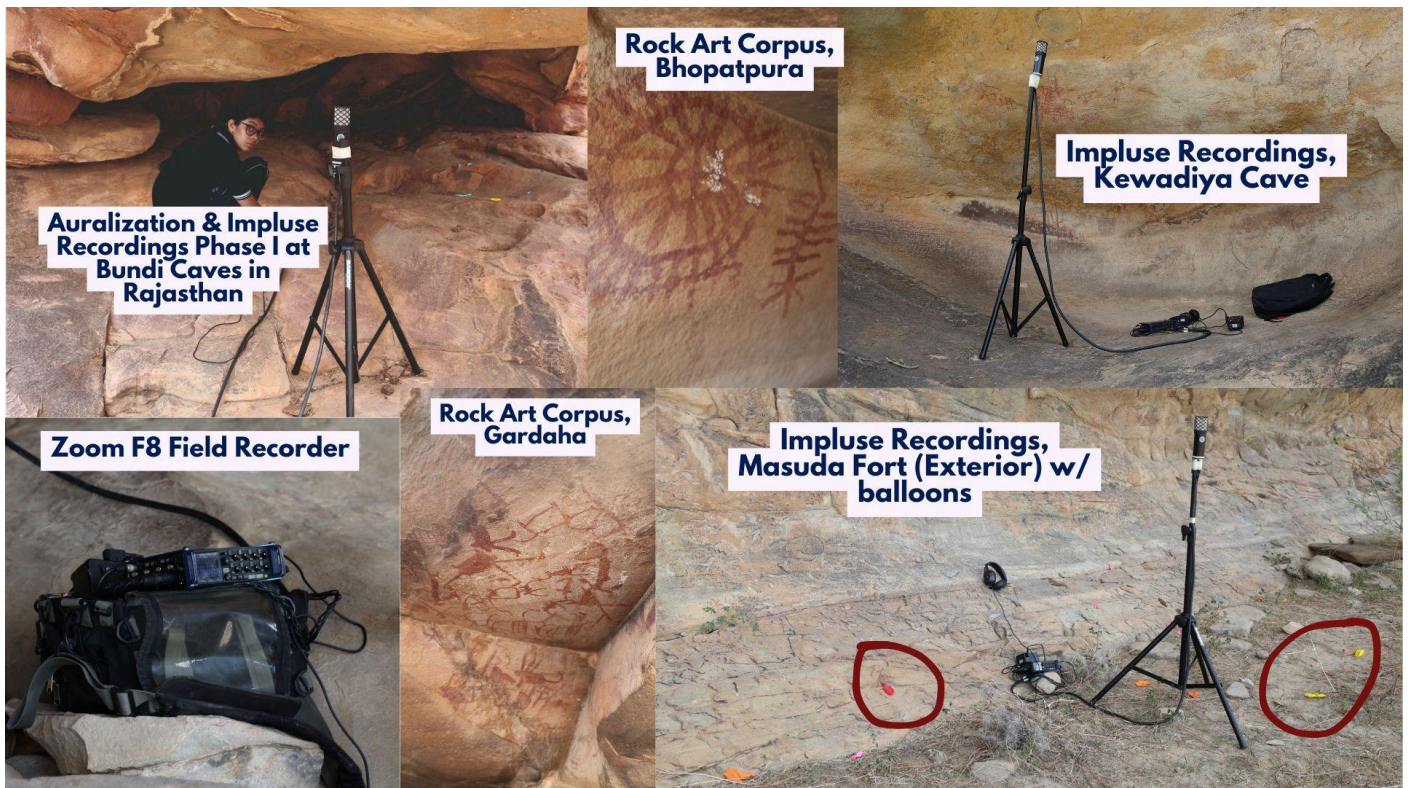
- Position 2: More variable acoustic quality, with low-frequency standing wave anomalies (reverberation >60 seconds at 125–250 Hz). Nonetheless, mid- and high-frequency performance remained strong, **making the space suitable for speech and most musical applications.**
- **Conclusion:** The shelter demonstrated a clear acoustic gradient, functioning as a natural amphitheater where different zones carried distinct sonic properties.

Medieval Temple: Jagat Shiromani Temple



Auralising Sati Practice (Widow Self-Immolation) Sites

We are currently working to auralise historic *sati* sites such as Deoli, Sirohi, and Pali, where memorial stones preserve traces of a practice now firmly consigned to history. Our aim is not to condone or romanticize *sati*, but to reconstruct the sensory conditions that shaped collective memory. Using impulse response measurements and acoustic modeling, we are experimenting with how **fire, lamentation, and ritual chants** might have resonated in these spaces.



Vertical 4 – Rock Art Corpus



We are **(1) surveying and documenting Rajasthan's rock art traditions**, particularly at sites such as Garrada, Golpur, Banka, and Sohanpur to **create a national inventory**. By pairing visual motifs with acoustic signatures, we are creating an expanded Rock Art Corpus.

Our documentation & surveying techniques include:

- a. GPS/GIS to record coordinates and topography
- b. High-resolution and raking-light photography; natural light variation photography
- c. Multi-spectral photography (UV+IR)
- d. 3D Scanning (5 sites so far)
- e. Dating & analysis using foundational relative/absolute dating

We **(2) build community-centric tourism models**, to make these sites accessible to broader publics. To date, we have organized 16 tours across Bundi and Bhilwara, introducing visitors not only to the paintings but also to the resonant soundscapes that animate these shelters. We are building an **open-access digital database** of Rajasthan's rock art corpus. This archive integrates **community knowledge**, drawing on local expertise to contextualize the sites. We aim to generate livelihood opportunities while deepening public engagement.

Expansion & Impact

We aim to expand this work to a wider constellation of sacred and cultural spaces - around India, from Sufi dargahs to subterranean meditation halls, and vernacular shrines. We will transcribe and record medieval chants, oral traditions, and devotional music, working closely with communities, including historically excluded voices such as the devadasis, to ensure that these sound archives are preserved with dignity.

Our next phase integrates **psychoacoustics**, examining how sound behaves in space and how it is perceived - its emotional, cognitive, and cultural impact. We also plan to pair field recordings with 360° imagery and immersive auralisation workflows, allowing scholars, performers, and communities enter environments through spatial audio technologies.