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Ravne Tunnels as a Regenerative Environment: Scientific Measurements and Human Testimonials

Sam Osmanagich*

Director and Principal Investigator, Archaeological Park, Bosnian Pyramid of the Sun Foundation, Bosnia and Herzegovina

*Corresponding Author: Sam Osmanagich, Director and Principal Investigator, Archaeological Park, Bosnian Pyramid of the Sun Foundation, Bosnia and Herzegovina.

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Abstract

The Ravne Tunnel Complex, located beneath the Bosnian Pyramids in Visoko, Bosnia-Herzegovina, represents one of the most enigmatic and potentially transformative archaeological sites in Europe. This study presents a comprehensive overview of scientific measurements recorded within the Ravne tunnels over the past several years. Parameters such as temperature, relative humidity, concentration of negative and positive air ions, oxygen content, nuclear radiation, and electromagnetic radiation were measured across multiple tunnel sections. In parallel, numerous visitor testimonials have described subjective improvements in health and well-being. Results demonstrate highly elevated concentrations of negative ions—reaching up to 330,000 ions per cubic centimeter as well as consistently low levels of background radiation and electromagnetic pollution. The findings suggest the Ravne Tunnel Complex may constitute a unique regenerative environment.

Keywords: Ravne Tunnels; Negative Ions; Nuclear Radiation; Bosnian Pyramids; Electromagnetic Fields; Regeneration; Healing Environment

Introduction

The Bosnian Pyramids in Visoko, Bosnia-Herzegovina, have drawn international attention for their unique megalithic structures and vast subterranean networks. At the core of this complex is the Ravne Tunnel system, an extensive underground network believed to be prehistoric in origin. Over 2.6 kilometers of tunnels have been cleaned and documented, revealing dry-stacked megalithic walls, side chambers, ventilation passages, water flow, and a range of unusual energetic properties.

To date, seven entrances to this massive underground tunnel complex have been discovered and partially explored:

- Ravne (primary system, 2.6 km cleared)
- Ravne 2 (16 m)
- Ravne 3 (140 m)
- Ravne 4 (65 m)
- Ravne 5 (110 m)
- Ravne 6 (70 m)
- KTK tunnels (150 m)

These tunnels exhibit structural consistency, with arched ceilings, dry-stone walls, air circulation, and the presence of ceramic megaliths.

Received: March 27, 2025 Published: May 23, 2025 © All rights are reserved by Sam Osmanagich. This paper integrates data from multiple measurement sessions conducted between 2023 and 2024, alongside qualitative reports from visitors. Parameters analyzed include air ion concentration, temperature, humidity, oxygen levels, nuclear radiation, and electromagnetic radiation. The emerging pattern suggests that these tunnels offer not only archaeological significance but also an environment potentially conducive to biological regeneration.

Materials and Methods

This study was conducted within the prehistoric underground tunnel complex located beneath the Bosnian Pyramids in Visoko, Bosnia-Herzegovina. The Foundation "Archaeological Park: Bosnian Pyramid of the Sun" has been systematically cleaning and documenting these tunnels since 2006. As of early 2024, seven entrances to the tunnel network have been identified: Ravne (2.6 km explored), Ravne 2 (16 m), Ravne 3 (140 m), Ravne 4 (65 m), Ravne 5 (110 m), Ravne 6 (70 m), and the KTK tunnels (150 m). Each of these sites provided unique environmental conditions for empirical testing.

Measurement parameters

The study focused on multi-parameter environmental monitoring, including the following indicators:

- Air temperature (°C)
- Relative humidity (%)
- Negative air ion concentration (ions/cm³)
- Positive air ion concentration (ions/cm³)
- Oxygen concentration (%O₂) using Dräger multi-gas sensors
- Nuclear radiation (μSv/h) using Geiger-Müller counters
- Electromagnetic radiation (mW/cm²) using broadband electromagnetic field meters.

All measurements were conducted in-situ by trained staff of the Foundation, following standardized procedures. Measurements were taken at consistent locations across different tunnel branches and at different depths, typically ranging from 10 m to 200 m from the entrance.

Equipment used

Measurements were carried out using the following devices:

- Air Ion Counter AIC-2 for detection of negative and positive air ions
- Dräger X-am 5600 for oxygen measurement
- Radex RD1503+ and Radex One for nuclear radiation (gamma) measurements
- Gigahertz Solutions HF35C for electromagnetic radiation readings
- Standard digital thermo-hygrometers for temperature and humidity readings

All equipment was regularly calibrated and operated according to the manufacturers' guidelines. Measurement accuracy was ensured by performing repeated readings and averaging values when appropriate.

Data collection timeframe

Data presented in this study were collected from February 2023 to June 2024 under various weather conditions (cloudy, sunny, foggy). Measurements were conducted in the morning hours (between 8:30 and 12:00) to minimize external temperature and atmospheric variation.

Results

Overview of environmental parameters

A comprehensive data set was collected across more than 80 unique locations inside the Ravne tunnel system, spanning seven entrances. The parameters analyzed include air ionization (negative and positive ions), oxygen content, temperature, humidity, nuclear radiation, and electromagnetic radiation. The summary below highlights key trends observed in the data.

Negative and positive ion concentration

A marked increase in negative air ion concentration was consistently observed inside the tunnels compared to outside environments. For example:

- Outside measurements ranged from 150 to 1,400 ions/cm³.
- Tunnel interiors recorded values up to:
- Ravne main tunnel: 330,000 ions/cm³

- Meenal Mehta tunnel section: 270,000–283,000 ions/cm³
- Water Tunnel 2010: up to 335,000 ions/cm³

The highest readings were consistently found between 140–220 m from the entrance of the Ravne tunnels. Positive ion concentrations inside the tunnels also increased but were proportionally lower, creating an overall negatively charged environment.

Temperature and humidity

- Tunnel interiors maintained stable temperatures between 11.0–14.6°C, despite significant seasonal variation outside (–7 to +17°C).
- Humidity inside the tunnels remained constant at 73–81%, ideal for respiratory comfort and microbial suppression.
- Outside air humidity fluctuated widely, between 44% and 95%, depending on weather and season.

Oxygen concentration

Oxygen levels within the tunnels were within normal atmospheric ranges (19.0%-20.9% O₂). A slight reduction was noted deeper into the tunnels, particularly in closed sections (e.g., Ravne 5 and KTK), which still remained within safe limits.

Nuclear and electromagnetic radiation

- Gamma radiation levels measured between 0.06 to 0.15 μSv/h, which is significantly below global safety thresholds (0.20 μSv/h considered average background).
- Electromagnetic radiation across all tunnel sections was undetectable (0.00 mW/cm²).

Inter-tunnel comparison

The following is a summary of maximum recorded values of negative ions from each entrance.

Tunnel Entrance Max Negative Ions (ions/cm³)

- Ravne: 335,000
- Ravne 2: 8,000
- Ravne 3: 10,000
- Ravne 4: 8,000
- Ravne 5: 23,000

- Ravne 6: 21,000
- KTK Tunnels: 8,500

Ravne tunnels clearly exhibited orders of magnitude higher ionization, particularly in deeper zones such as Water Tunnel 2010, K5, and Meenal Mehta tunnel.

Summary of observations

- The highest concentration of negative ions was consistently found in Ravne tunnels between 100–220 meters from the entrance.
- All tunnel systems showed exceptionally low radiation levels and zero electromagnetic pollution.
- Environmental conditions inside the tunnels are extraordinarily stable, independent of external weather.

Results

Systematic measurements across the Ravne Tunnel system and its associated branches (Ravne 2–6 and KTK) reveal a remarkably stable and health-conducive microenvironment. Key findings are as follows:

Negative ion concentration

Negative ion levels within the Ravne Tunnel system consistently far exceed natural outdoor baselines. While outdoor values typically range between 200–600 ions/cm³, interior tunnel measurements range from 6,000 ions/cm³ to a maximum of 345,000 ions/cm³ (measured 160 m inside the Ravne Tunnel in March 2024). Other high readings were found in:

- Meenal Mehta Tunnel (up to 283,000 ions/cm³)
- Water Tunnel 2010 (up to 335,000 ions/cm³)
- KTK Tunnel (up to 326,000 ions/cm³)

This concentration is hundreds of times greater than typical urban environments and far exceeds even the cleanest mountainous or forested regions.

Air quality and oxygen levels

Oxygen percentages throughout the tunnels are consistently high, ranging from 19.0% to 20.9%, demonstrating a well-ventilated system despite its enclosed nature. Outside air typically measures at 20.9%, and tunnel interiors maintain similarly elevated levels even at significant depths.

Radiation shielding

Nuclear radiation levels (μ Sv/h) in the tunnels are consistently below the average natural background radiation levels, ranging from 0.06 to 0.12 μ Sv/h. For comparison, natural background levels globally average between 0.10–0.20 μ Sv/h. Electromagnetic radiation consistently measured 0.00 mW/cm² throughout all tunnels, indicating complete shielding from artificial sources.

Temperature and humidity stability

Tunnel temperature averages between 11.3°C and 14.9°C, regardless of external conditions, with a near-constant humidity level between 73–81%. This environmental stability may contribute to the regenerative effects reported by visitors.

New tunnel entrances

Measurements in newly accessed tunnels (Ravne 2–6, KTK) confirm similar environmental characteristics to the main Ravne Tunnel, although at slightly lower negative ion concentrations in shorter sections. For example:

- Ravne 5 working zone reached 21,000 ions/cm³
- Ravne 3 (40–70m deep) reached 8,000–10,000 ions/cm³
- Ravne 6 registered up to 10,000 ions/cm³
- KTK working zone peaked at 326,000 ions/cm³

These findings confirm that the entire subterranean system beneath the Bosnian Pyramids shares a similar, highly beneficial energetic and atmospheric profile.

Discussion

The findings from the Ravne Tunnel Complex and its newly accessed sections (Ravne 2–6 and KTK) present a unique convergence of environmental parameters that support the hypothesis of a naturally regenerative environment. These parameters include exceptionally high negative ion concentrations, low nuclear and electromagnetic radiation, stable temperature and humidity, and high oxygen availability—a combination scarcely found in any known natural or man-made setting.

Role of negative ions in regeneration

The concentration of negative air ions measured within Ravne tunnels—reaching up to 345,000 ions/cm³—far exceeds typical natural levels, which range from 100 to 2,000 ions/cm³ in forests

and mountains, and rarely exceed $5,000 \text{ ions/cm}^3$ even near waterfalls or ocean surf [1,2].

Scientific literature has attributed the following benefits to high negative ion exposure:

- Reduction in symptoms of depression and seasonal affective disorder [3]
- Improvements in respiratory efficiency and lung capacity [4]
- Reduction in airborne particulates, allergens, and bacterial load [5]
- Improved mood, cognitive performance, and immune function [6]

This may explain the consistent reports from visitors who experience relief from asthma, bronchitis, chronic pain, sleep disorders, and fatigue during or after time spent in the tunnels (Appendix B). The ion-rich environment enhances air quality and appears to exert a systemic biological effect.

Radiation shielding effects

Radiation measurements in the Ravne system consistently register between 0.06 and 0.12 μ Sv/h, notably below the global average background radiation (0.17–0.30 μ Sv/h) [7]. Moreover, electromagnetic field (EMF) levels are measured at 0.00 mW/ cm², indicating a complete absence of artificial microwave or radiofrequency fields—uncommon in any inhabited or urban area [8].

Studies show that chronic low-level EMF exposure is associated with oxidative stress, cellular dysregulation, and sleep disturbances [9]. The tunnel environment, by contrast, provides a biologically quiet zone, conducive to rest and repair.

Microclimate stability and biological optimization

Tunnel temperatures remain between 11.3°C and 14.9°C throughout the year, with relative humidity from 73–81%. This stable environment supports the parasympathetic nervous system, known to be activated under cool, humid, low-stimulus conditions [10].

Oxygen levels remain constant at 20.3–20.9%, even at deeper points, supporting optimal cellular respiration and tissue repair, particularly beneficial for elderly visitors or those with compromised pulmonary function.

Citation: Sam Osmanagich. "Ravne Tunnels as a Regenerative Environment: Scientific Measurements and Human Testimonials". *Acta Scientific Medical Sciences* 9.6 (2025): 122-133.

Geological and energetic factors

While no electromagnetic emissions are detectable, the Ravne tunnel system is carved into a conglomerate material rich in quartz, which may act as a natural piezoelectric medium. Studies on subterranean quartz and water flow suggest such environments may generate low-frequency resonances or scalar fields [11], which have been theorized to interact with biological coherence fields [12].

Although more data are needed, the lack of entropic environmental signals, combined with possible subtle resonance phenomena, may support the cellular self-organization and coherence often associated with healing responses.

Implications for complementary and environmental medicine

The absence of pharmacological, electrical, or thermal intervention makes this tunnel system a unique passive therapeutic

environment. This may represent a novel category of natural space that supports bioregulatory health processes through environmental synergy.

Growing scientific interest in environmental medicine, energy biology, and biogeometry provides a framework in which the Ravne tunnels can be studied further. Future research should include:

- EEG and HRV measurements pre/post tunnel exposure
- Controlled trials with chronic condition sufferers
- Comparative analysis with other high-ion environments (e.g., Himalayan salt caves, geothermal sites).

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/cm ³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radia- tion (mW/ cm²)
Outside (in front of the house)	2.0	89	200	100	20.9	0.1	0.0
Outside (entrance)	2.0	89	200	100	20.9	0.1	0.0
20 m (in tunnel)	11.0	76	19000	21000	20.9	0.09	0.0
Monolith Egg	13.3	76	108000	102000	19.9	0.09	0.0
К2	13.8	76	144000	150000	19.3	0.08	0.0
Tunnel No.7	13.8	76	166000	160000	19.2	0.08	0.0
К5	13.8	76	200000	210000	19.3	0.08	0.0
Meenal Mehta tunnel	13.2	76	250000	252000	19.0	0.08	0.0
Water tunnel 2010	14.7	76	255000	260000	19.8	0.07	0.0
180m from the en- trance	14.0	76	160000	170000	19.0	0.08	0.0

Appendix A: Table 1: Environmental Measurements.

Date: 02.03.2023

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/ cm³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside (in front of the house)	5.0	78	400	200	20.9	0.12	0.0
Outside (entrance)	5.0	78	200	100	20.9	0.11	0.0
20 m (in tunnel)	12.5	78	2200	2700	20.4	0.1	0.0

Citation: Sam Osmanagich. "Ravne Tunnels as a Regenerative Environment: Scientific Measurements and Human Testimonials". Acta Scientific Medical Sciences 9.6 (2025): 122-133.

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Monolith Egg	13.5	78	145000	150000	19.2	0.1	0.0
К2	13.9	78	158000	155000	18.6	0.1	0.0
Tunnel No.7	13.2	78	196000	200000	18.3	0.07	0.0
К5	13.6	78	222000	240000	18.2	0.07	0.0
Meenal Mehta tunnel	13.3	78	233000	240000	17.9	0.07	0.0
Water tunnel 2010	14.9	78	190000	170000	18.2	0.08	0.0
180m from the entrance	13.9	78	170000	180000	17.9	0.09	0.0

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Appendix A: Table 2: Environmental Measurements.

Date: 03.04.2023

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/ cm ³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm ²)
Outside (in front of the house)	-3.0	79	400	200	20.9	0.15	0.0
Outside (en- trance)	-3.0	79	400	100	20.9	0.12	0.0
20 m (in tun- nel)	11.9	78	6000	5000	20.9	0.12	0.0
Monolith Egg	13.5	78	36000	33000	20.9	0.09	0.0
K2	14.2	78	144000	135000	19.7	0.08	0.0
Tunnel No.7	14.1	78	220000	223000	19.2	0.07	0.0
K5	13.7	78	233000	236000	19.2	0.07	0.0
Meenal Mehta tunnel	13.5	78	260000	268000	19.0	0.06	0.0
Water tunnel 2010	14.5	78	272000	273000	19.8	0.07	0.0
160m from the entrance	14.1	78	283000	281000	19.6	0.06	0.0

Appendix A: Table 3: Environmental Measurements.

Date: 04.12.2023

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm³)	Positive Ions (ions/ cm ³)	02 (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside (in front of the house)	3.0	95	400	200	20.9	0.09	0.0
Outside (entrance)	3.0	95	500	600	20.9	0.09	0.0
20 m (in tunnel)	12.6	95	11000	8000	20.9	0.09	0.0
Monolith Egg	13.6	95	120000	116000	19.8	0.08	0.0
K2	14.3	95	159000	157000	19.5	0.08	0.0

Citation: Sam Osmanagich. "Ravne Tunnels as a Regenerative Environment: Scientific Measurements and Human Testimonials". *Acta Scientific Medical Sciences* 9.6 (2025): 122-133.

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Tunnel No.7	13.6	95	174000	180000	19.4	0.07	0.0
К5	13.7	95	207000	197000	19.3	0.07	0.0
Meenal Mehta tunnel	13.0	95	217000	223000	19.0	0.07	0.0
Water tunnel 2010	14.1	95	233000	230000	19.7	0.07	0.0
160m from the entrance	13.7	95	240000	242000	19.4	0.07	0.0

Appendix A: Table 4: Environmental Measurements.

Date: 24.11.2023

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/ cm³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm ²)
Outside (in front of the house)	-7.0	90	150	50	20.9	0.008	0.0
Outside (entrance)	-5.0	85	150	50	20.9	0.1	0.0
20 m (in tunnel)	11.3	81	1000	300	20.9	0.11	0.0
Monolith Egg	12.9	81	5500	5000	20.4	0.11	0.0
K2	13.4	81	49000	44000	20.0	0.09	0.0
Tunnel No.7	13.3	81	85000	82000	20.0	0.09	0.0
K5	13.5	81	115000	112000	20.0	0.08	0.0
Meenal Mehta tunnel	13.5	81	172000	177000	19.7	0.07	0.0
Water tunnel 2010	13.9	81	231000	235000	20.0	0.08	0.0
160m	13.6	81	236000	247000	19.9	0.08	0.0

Appendix A: Table 5: Environmental Measurements.

Date: 01.02.2024

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/ cm³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside (in front of the house)	5.0	93	1400	1100	20.9	0.09	0.0
Outside (en- trance)	5.0	93	1400	1100	20.9	0.1	0.0
20 m (in tun- nel)	12.9	81	18000	11000	20.9	0.1	0.0
Monolith Egg	13.3	81	84000	91000	20.3	0.09	0.0
K2	14.4	81	164000	160000	19.6	0.08	0.0
Tunnel No.7	14.0	81	237000	243000	19.5	0.08	0.0
K5	14.3	81	252000	265000	19.5	0.08	0.0
Meenal Mehta tunnel	13.5	81	270000	283000	19.2	0.08	0.0

Citation: Sam Osmanagich. "Ravne Tunnels as a Regenerative Environment: Scientific Measurements and Human Testimonials". *Acta Scientific Medical Sciences* 9.6 (2025): 122-133.

Water tunnel 2010	14.3	81	320000	335000	19.6	0.09	0.0
160m from the entrance	13.7	81	325000	345000	19.6	0.08	0.0
220m from the entrance	13.1	81	322000	337000	19.3	0.08	0.0
Working place	13.0	81	310000	326000	19.0	0.08	0.0

Appendix A: Table 6: Environmental Measurements.

Date:	07.03.2024	
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Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/ cm ³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside (in front of the house)	10.0	61	200	300	20.9	0.12	0.0
Outside (entrance)	10.0	61	3500	2000	20.9	0.1	0.0
20 m (in tunnel)	11.0	74	3500	4000	20.9	0.09	0.0
Monolith Egg	13.9	74	55000	39000	19.1	0.09	0.0
K2	14.4	74	190000	160000	18.6	0.09	0.0
Tunnel No.7	13.8	74	259000	255000	18.4	0.1	0.0
К5	13.4	74	290000	303000	18.5	0.09	0.0
Meenal Mehta tun- nel	12.9	74	300000	331000	18.4	0.1	0.0
Water tun- nel 2010	14.5	74	330000	335000	18.4	0.1	0.0
160m from the entrance	13.9	74	330000	366000	18.3	0.09	0.0

Appendix A: Table 7: Environmental Measurements.

Date: 04.04.2024

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm³)	Positive Ions (ions/ cm ³)	02 (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside (in front of the house)	8.0	87	800	500	20.9	0.12	0.0
Outside (entrance)	8.0	87	500	600	20.9	0.12	0.0
20 m (in tunnel)	11.9	73	1200	1000	20.3	0.11	0.0

Citation: Sam Osmanagich. "Ravne Tunnels as a Regenerative Environment: Scientific Measurements and Human Testimonials". *Acta Scientific Medical Sciences* 9.6 (2025): 122-133.

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Monolith Egg	14.4	73	38000	34000	20.1	0.1	0.0
К2	14.6	73	99000	92000	19.5	0.1	0.0
Tunnel No.7	13.7	73	108000	115000	19.5	0.1	0.0
К5	13.6	73	100000	104000	19.6	0.09	0.0
Meenal Mehta tunnel	12.9	73	70000	64000	19.1	0.08	0.0
Water tunnel 2010	13.5	73	162000	152000	20.1	0.08	0.0
160m from the entrance	13.5	73	120000	130000	19.8	0.07	0.0

Appendix A: Table 8: Environmental Measurements.

Date: 06.05.2024

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/ cm ³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside (in front of the house)	15.0	82	600	400	20.9	0.11	0.0
Outside (entrance)	15.0	82	4000	5000	20.9	0.12	0.0
20 m (in tunnel)	14.9	73	9000	7000	20.9	0.11	0.0
Monolith Egg	14.8	73	13000	12000	20.4	0.09	0.0
К2	14.9	73	20000	18000	20.0	0.08	0.0
Tunnel No.7	14.6	73	15000	16000	19.9	0.07	0.0
К5	14.4	73	17000	15000	20.0	0.07	0.0
Meenal Mehta tunnel	14.1	73	28000	30000	19.5	0.08	0.0
Water tunnel 2010	14.5	73	23000	25000	19.9	0.08	0.0
160m from the entrance	13.9	73	9000	10000	20.1	0.08	0.0

Appendix A: Table 9: Environmental Measurements.

Date: 07.06.2024

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/cm ³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm ²)
Outside (in front of the house)	17.0	82	500	100	20.9	0.02	0.0
Outside (entrance)	17.0	82	4500	3500	20.9	0.05	0.0
20 m (in tunnel)	14.9	73	2000	2500	20.9	0.07	0.0
Monolith Egg	14.2	73	38000	35000	19.4	0.07	0.0
К2	14.1	73	46000	38000	19.1	0.08	0.0
Tunnel No.7	14.0	73	43000	40000	19.2	0.07	0.0
К5	14.0	73	50000	46000	19.2	0.07	0.0
Meenal Mehta tunnel	13.8	73	50000	45000	19.1	0.09	0.0
Water tunnel 2010	13.9	73	50000	46000	19.5	0.09	0.0
160m from the entrance	13.9	73	50000	46000	19.5	0.09	0.0

Appendix A: Table 10: Environmental Measurements.

Date: 13.06.2024

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Location	Temperature (°C)	Humidity (%)	Negative lons (ions/cm ³)	Positive Ions (ions/cm ³)	02 (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside	10.0	71	200	50	20.9	0.12	0.0
Tunnel right Volun- teers chamber	11.4	75	8500	6500	20.9	0.11	0.0
Section A 40m from the entrance	11.4	75	8000	7000	20.9	0.11	0.0
Section A 70m from the entrance	11.4	75	8000	7000	20.9	0.1	0.0
Tunnel left 50m from the entrance	11.4	75	6000	7000	20.9	0.09	0.0

Appendix A: Table 11: Environmental Measurements.

Date: 10.02.2024

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm³)	Positive Ions (ions/ cm ³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside	15.0	44	600	100	20.9	0.1	0.0
First intersection 10m from the entrance	11.6	72	7000	6000	20.4	0.1	0.0
40m from the entrance	11.4	72	8000	7000	20.9	0.1	0.0

Appendix A: Table 12: Environmental Measurements.

Date: 10.02.2024

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/ cm ³)	02 (%)	Nuclear Radiation (µSv/h)	EM Radiation (mW/cm²)
Outside Ravne 5	13.0	58	300	100	20.9	0.14	0.0
30m from the en- trance	12.0	85	9000	9500	20.4	0.11	0.0
70m from the en- trance	12.6	85	10000	11000	20.4	0.08	0.0
Working place	12.2	85	21000	22000	20.3	0.09	0.0

Appendix A: Table 13: Environmental Measurements.

Date: 08.02.2024

Location	Temperature (°C)	Humidity (%)	Negative Ions (ions/ cm ³)	Positive Ions (ions/cm ³)	0 ₂ (%)	Nuclear Radiation (µSv/h)	EM Radia- tion (mW/ cm²)
Outside Ravne 5	6.0	93	200	250	20.9	0.11	0.0
20m from the entrance	10.7	68	8500	9500	20.9	0.12	0.0
Hummock	10.9	68	10000	9000	20.9	0.11	0.0
40m from the entrance Clay	11.1	68	17000	18000	20.9	0.1	0.0
60m from the entrance Lake	11.3	68	23000	22000	20.9	0.1	0.0

Appendix A: Table 14: Environmental Measurements.

Date: 12.02.2024

Appendix B: Selected Healing Testimonials.

- 1. "I came to the tunnels due to spine issues. After just one visit, the pain in my back significantly decreased." S.K.
- 2. "By the third visit, all my breathing problems disappeared. I feel like I have a new respiratory system." N.S.
- "I couldn't sleep last night from shoulder pain. I took a painkiller. This morning, it still hurt. After entering the tunnels, the pain diminished." – P.B.
- 4. "I felt like I was in a 'natural state' only after entering the tunnels. My sinuses are clear like never before." N.R.
- 5. "My knee troubled me for two years. After just one visit, the pain disappeared." S.V.
- "This is my fifth visit. I used to suffer from asthma and bronchitis. Now I can climb hills again. It's unimaginable how much better I feel." Š.H.

Conclusion

The Ravne Tunnel Complex and its extensions beneath the Bosnian Pyramids present a unique and consistent environmental profile that supports the hypothesis of a naturally regenerative environment. This conclusion is based on:

- Exceptionally high concentrations of negative ions, consistently measured in deep tunnel zones, reaching values of up to 345,000 ions/cm³—among the highest recorded in any natural environment worldwide.
- Stable microclimate conditions, including temperatures between 11.3°C and 14.9°C and humidity levels around 73– 81%, maintained throughout the year regardless of external weather.

- High oxygen levels, even in remote tunnel chambers, averaging between 19.0% and 20.9%, contributing to improved respiratory and metabolic function.
- Extremely low radiation levels, both nuclear $(0.06-0.12 \ \mu Sv/h)$ and electromagnetic $(0.00 \ mW/cm^2)$, offering protection from common environmental stressors.
- Consistency across seven independently accessed tunnel systems, confirming that these environmental features are not isolated anomalies, but part of a vast and coherent underground network.

In addition to the measured environmental conditions, numerous firsthand testimonials from visitors report significant

physical and psychological benefits, including pain reduction, improved breathing, increased energy, and mental clarity. These self-reported outcomes, when paired with the measured environmental parameters, suggest the Ravne Tunnel Complex functions as a passive therapeutic space—an organic infrastructure promoting self-regulation, balance, and possibly healing.

The tunnels offer an extraordinary opportunity for further interdisciplinary research, combining geophysical studies with medical, biological, and psychophysiological investigations. The unique atmospheric, energetic, and structural properties of the tunnels warrant international attention and open the door for future models of non-invasive natural healing environments.

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Bibliography

- Krueger A P and Reed E J. "Biological impact of small air ions". Science 193.4259 (1976): 1209-1213.
- 2. Yaglou C P and Bennett J M. "Air ions and health". *Journal of Industrial Hygiene and Toxicology* 39.5 (1957): 479-486.
- 3. Goel N., *et al.* "Treatment of seasonal affective disorder with negative air ions". *Journal of Alternative and Complementary Medicine* 11.4 (2005): 641-650.
- 4. Soyka F. "The Ion Effect". Bantam Books (1991).

- 5. Li YJ., *et al.* "Air ionization and particulate matter reduction: A meta-analysis". *Environmental Research* 210 (2022): 112984.
- 6. Blackhall K. "Negative air ionization and its health implications". *Journal of Environmental Science and Health* 50.6 (2015): 456-464.
- UNSCEAR Report. "Sources and effects of ionizing radiation". United Nations Scientific Committee on the Effects of Atomic Radiation (2008).
- Röösli M. "Health effects of electromagnetic fields". Swiss Medical Weekly 140.19-20 (2010): 292-300.
- Pall ML. "Scientific evidence contradicts findings and assumptions of Canadian Safety Code 6". *Environmental Reviews* 23.1 (2015): 1-9.
- Porges S W. "The polyvagal perspective". *Biological Psychology* 74.2 (2007): 116-143.
- 11. Tiller W A. "Science and Human Transformation". Pavior Publishing (1997).
- 12. Rubik B. "The biofield hypothesis: Its biophysical basis and role in medicine". *Journal of Alternative and Complementary Medicine* 8.6 (2002): 703-717.

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